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Editorial Comment

As the editorial responsibilities are passed from Larry Cummings to me with this issue, I wish to express the Academy's gratitude to Larry for his effective and indispensable service as the Editor. While coping with the administrative and academic complexities of editing the *Journal*, Larry has been able to enhance the scholarly reputation of the *Journal* to its worldwide status.

Concerning *AMJ*'s editorial policy, I plan to make no major changes. The *Journal* is looking for manuscripts that are well argued and well written. Clear writing is not an adornment but one basic proof that the author understands the research problem and how the problem relates to the prevailing scholarship in that area of inquiry. The *Journal* presents empirical research in all areas of the Academy and will strive to develop an interdisciplinary focus. Methodological studies concerned with the development of measuring instruments, replications, negative results, and failures to replicate published work are acceptable if they are judged to make a substantial contribution to the field. Manuscripts will be assessed not only by their theoretical rigor, but also by their importance and innovation in the field.

The *Journal* is not biased toward a mode of analysis, but insists that the research design and data analysis be consistent with the underlying research questions posed in the manuscript. The *Journal* welcomes studies that allow attributions of causality through the use of longitudinal, quasi-experimental, and experimental designs.

I would like to take this opportunity to introduce the new Editorial Board and to thank its members for their willingness to serve the *Journal* and the Academy. Their names are listed on the masthead.

John W. Slocum, Jr.
Editor, *AMJ*

Structural Model of Leadership Influence in a Hospital Organization¹

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Path analysis was used to develop a structural model of the head nurse's leadership influence in a large metropolitan hospital. The study indicates that the head nurse's consideration behavior had an inverse effect on her staff member's job related tension but also had an inverse effect on the employee's job performance. Her initiating structure behavior had a positive effect on employee terminations particularly in the structured task situations. The role of structural models in leadership research is discussed.

Previous leadership research has generally focused on the development of descriptive models of leadership contingency theory (Kerr & Schriesheim, 1974; Korman, 1974; Lord, 1976). In these models, leadership behavior was treated as the independent variable which was correlated with criterion measures of the subordinate's job satisfaction (Evans, 1974; House, 1971; House & Dessler, 1974; Stinson & Johnson, 1975), job performance (Downey, Sheridan & Slocum, 1975; House & Kerr, 1973; Sims & Szilagyi, 1975), and decisions to terminate employment (Dansereau, Cashman & Graen, 1973; Fleishman & Harris, 1962). In these studies and others, contingency relationships were tested by treating situational factors as subgrouping variables to differentiate sample groups for whom the prediction error of leadership effects is small from those groups for whom the prediction error is large (Kerr, Schriesheim, Murphy & Stogdill, 1974). The differences in predictive validity between subgroups were tested by comparing the correlations between leadership behavior

¹This research was supported by a Faculty Research Grant from Wayne State University. The authors gratefully acknowledge the cooperation of Dr. Thomas R. O'Donovan and Arlene Mikel, R.N. of Mt. Carmel Hospital for their assistance in conducting this study.

and the criterion variables obtained in different sample groups (Korman & Tanofsky, 1975).

The use of situational factors to establish sample subgroups presumes that the situation acts as an interactive moderator variable which is uncorrelated with both the predictor and criterion variables (Zedeck, 1971). Zedeck noted, however, that the comparative analysis of subgroup correlations often fails to consider the effect of the situational factor as an independent predictor of the criterion variable. The question, therefore, arises in leadership research as to whether the situation itself has a significant additive effect on the criterion measure in conjunction with the leader's influence.

Another problem related to subgroup analysis concerns the interpretation of the process by which the situation affects the leader's relationships with subordinates (Lord, 1976). Heise (1969) noted that causality was immaterial in testing descriptive models of contingency relationships since the correlations merely indicate the relative efficiency of estimating the criterion variables when knowing the leader's behavior in a given situation. However, there are various causal interpretations that can be made of the observed contingency relationships. House and Mitchell (1974) have suggested several situational influences on leadership effectiveness. First, the situation may foster the subordinate's preference for certain styles of leadership behavior. Second, the situational variables may serve as stimuli to motivate and direct the subordinate's work effort. Third, the situation may act to constrain variability in the subordinate's behavior. Fourth, the situational factors may serve as rewards for achieving desired performance. Likewise, Nebeker and Mitchell (1974) indicated that differences in leadership behavior could be explained by the leader's expectations that a certain style of leadership would be effective in a given situation.

These processes imply different causal effects in the manner which the situation impacts on the relationships between leadership behavior and the criterion measures. The situation could act as an exogenous effect, or an instrumental variable (Heise, 1975), which influences the leader's behavior and also directly, or indirectly, affects the subordinate's criterion measure. Thus, a spurious relationship between leadership behavior and the criterion variable may be observed in a given situation due to shared covariance with the situational variable. Alternatively, the situation could act as an intervening variable between leadership behavior and the subordinate's criterion measure. An indirect relationship between leadership behavior and the criterion variable would emerge to the extent that the leader's behavior influences the situational variable which, in turn, affects the criterion measure. The descriptive models cannot confirm either of these different causal interpretations. Therefore, the process of leadership influence that occurs within an organization cannot be comprehensively understood solely through descriptive models.

An alternative research paradigm to using comparative subgroup analysis in testing contingency theories is the development of a structural

model of the underlying leadership influence process. In distinction to descriptive models, a structural model attempts to:

...define a set of equations which, in some sense, corresponds to actual causal processes in the real world; that is, one seeks a set of equations which permit predictions of how a change in any one variable in the system affects the values of other variables in the system (Heise, 1969, p. 41).

Heise indicated that there were three basic approaches to analyzing structural relationships. The experimental approach (Lord, 1976; Lowin, Hrapchak & Kavanagh, 1974; Weed, Mitchell & Moffitt, 1976) uses a controlled sequence of manipulations to observe the consequences of altering leadership behavior or situational variables. The longitudinal approach (Downey, Sheridan & Slocum, 1976; Franklin, 1975; Greene, 1975; Greene & Schriesheim, 1977) observes naturally occurring changes in leadership behavior and their consequences to draw inferences regarding the causal ordering of events. A third approach involves path analysis of cross-sectional data (Dessler & Valenzi, 1977; Sims & Szilagyi, 1975). The cross-sectional approach takes advantage of natural differences in leadership behavior and situational variables by focusing on causal effects that have occurred in the past. The presumption is made that at a single point in time some individuals in the sample population have undergone a natural manipulation as a result of working in a given situation for a supervisor with a particular leadership style, while others have experienced the effects of different situations and varying leadership behavior. The experimental and longitudinal approaches provide the strongest inferences of causality. With these approaches, the research can employ both inductive logic from relationships suggested by theory as well as temporal logic from a known time sequence of events to infer causal effects. Path analysis of cross-sectional data provides weaker inferences of causality since the interpretation of causal effects is induced only from the relationships posited by theory.

The present research used a hybrid design, involving path analysis of both cross-sectional and time-lagged data, to develop a structural model of the head nurse's leadership influence in a hospital organization. Concurrent measures of the head nurse's leadership behavior and situational variables were obtained through questionnaire responses. Independent measures of the staff member's job performance and decisions to terminate employment were obtained at a later time. The underlying rationale for this design is that the head nurse's leadership behavior and situational variables could influence the subordinate's subsequent behavior, but it would be unlikely that the later behavioral measures could have caused the subordinate's perceptions measured several months earlier.

The study focused on the leadership behavior dimensions of initiating structure and consideration because of the considerable research that has examined these two leadership behaviors under various situational conditions (Kerr et al., 1974). The situational variables could be classified as

characteristics of individual employees, work groups and job tasks (House & Mitchell, 1974).

Individual Characteristics

The individual characteristics included the subordinate's job experience and perceived locus of control. It was posited that these individual attributes would have an exogenous effect in the structural model since it would be illogical to assume that the head nurse's leadership could influence the attributes of individual subordinates. It has been suggested, however, that the subordinate's job experience and personality traits would influence the leader's behavior, or at least the subordinate's perceptions of their leader's behavior (Badin, 1974; Bass, 1960; Durand & Nord, 1976; Pryor & Distefano, 1971). The nurse's attributes have also been related to her perceptions of situational variables such as job tension (Alutto, Hrebiniak & Alonso, 1976), her job performance (Dyer, Monson & Van Drimmelen, 1975), and terminations (Bognanno, Hixson & Jeffers, 1976; Price & Bluedorn, 1977). Thus, the direct effects of the subordinate's locus of control may partially explain the different relationships between leadership behavior and criterion measures that were observed in subgroups of internal and external subordinates (Evans, 1974; Mitchell, Smyser & Weed, 1975). Likewise, to the extent that longer job experience is related to the employee's perceptions of her leader's behavior, her organizational dependence and her ability to complete job assignments, the subordinate's job experience alone may explain part of the moderating effects on leadership influence that were attributed to organizational dependence (House & Kerr, 1973) and perceived job ability (Kavanagh, 1972).

Work Group Characteristics

House and Mitchell (1974) suggested that work group cohesion and group norms could affect the leader's influence on subordinates by providing social rewards for desired behavior and maintaining group norms which constrain the subordinates' behavior. Research has suggested that these group process variables are influenced by the leader's behavior and act as intervening variables to mediate both the leader's influence on the group members' satisfaction and performance as well as the effects of other situational variables (Greene & Schriesheim, 1977; Stogdill, 1974).

Greene and Schriesheim also found that the strength of the relationships between leadership behavior and group process variables varied between small and large groups. Therefore, it was posited that group size may have an exogenous effect in the structural model. It would be unlikely that the leader's behavior would influence group size. Hemphill (1950), however, indicated that the reverse relationship may exist in that effective leaders tend to provide higher structure and lower consideration in large work

groups. Likewise, the work group size may indirectly influence the subordinates' criterion measures because of the size effect on group process variables (Hare, 1976).

Job Characteristics

The job characteristics included task structure and job tension. The path-goal theory of leadership (House, 1971; House & Dessler, 1974) viewed task structure as having an important moderating effect on the relationship between the leader's behavior and subordinates' criterion measures. However, several studies comparing the observed leadership relationships in sample groups representing structured and unstructured task conditions have provided inconclusive evidence regarding the strength of the posited moderating effect of task structure (Schriesheim & Von Glinow, 1977). In the present study, task structure was viewed as an inherent characteristic of the subordinate's job which could have an exogenous effect in a structural model of leadership influence. It was posited that the subordinates' task structure could directly influence the leader's behavior (Hill & Hughes, 1974; Lord, 1976) and could also have significant additive effects with leadership behavior and individual attributes in explaining the subordinate's job involvement and performance (Rabinowitz, Hall & Goodale, 1977; Weed, Mitchell & Moffitt, 1976).

Job tension may affect the leader's influence because it places additional pressures on the subordinates in the form of work overload, stressful task demands and conflicting or ambiguous role expectations (Dawson, Meese & Phillips, 1972). Studies have indicated that the leader's behavior is related to the subordinate's perceived job tension, particularly as the leader's behavior results in conflicting or ambiguous role expectations (Behr, 1976; House & Rizzo, 1972). Therefore, job tension was viewed as an intervening variable in the structural model which can be influenced by the leader's behavior and acts to mediate the leader's influence on the subordinate's criterion measures (Dessler & Valenzi, 1977; Sims & Szilagyi, 1975).

METHOD

Data Collection

Questionnaires were administered to nursing employees at a large metropolitan hospital. The questionnaires were administered directly by the researchers at group meetings during work hours. Each meeting was attended by employees from different hospital sections including intensive care, emergency, operating room, surgical, medical and pediatric units. Individual responses were confidential, although respondents were asked to identify themselves in order to match their responses with subsequent measures of their job performance and termination decisions. A total of

372 employees completed the questionnaire, of which 288 employees (77 percent) voluntarily identified themselves. There were no significant differences in variable scores between the self-identified and nonidentified respondents. This self-identified sample was comprised of 102 registered nurses, 120 licensed practical nurses and 66 nurses' aides. To assure that estimates of all path coefficients were derived from a common sample, any respondent who had missing data on any of the measured variables was eliminated from the sample (Heise, 1969). These eliminations reduced the sample size in the path analysis to 209 employees.

The following variables were measured in the study:

Leadership Behavior—Each nursing employee described the leadership behavior of her head nurse on Form XII of the Leadership Behavior Description Questionnaire (LBDQ) (Stogdill, 1963). Two dimensions of leadership behavior, initiating structure (INITSTR) and consideration (CONSID), were of particular interest in this study. Schriesheim and Kerr (1974) and Schriesheim and Stogdill (1975) discussed the construct validity of these two leadership dimensions.

Job Experience (JOBEXP)—Subordinates reported the length of time they worked in their present position within the hospital. The subordinates' mean job experience was 4.7 years with a standard deviation of 4.9 years.

Locus of Control (LOCUS)—An instrument developed by Rotter (1966) measured the frequency that subordinates selected statements indicating that they maintained control over the events that happen to them (internal locus of control) or that these events were controlled by others or were chance occurrences (external locus of control). Scores were determined by the proportion of statements selected which represent an external locus of control.

Group Size (SIZE)—Hospital records indicated the number of registered nurses, licensed practical nurses and nurses' aides, who reported to each head nurse. The size of specific work groups ranged from five to 17 employees.

Group Relations (GROUP)—An instrument developed by Kruse and Stogdill (1973) measured three facets of work group relations: group cohesion, group work and group drive. Group cohesion measured the extent that co-workers are congenial and cooperative with each other. Group work measured the extent that group members maintained a norm of high quality patient care. Group drive measured the extent that co-workers approached their jobs with enthusiasm. The average correlation between the three group relation variables was ($\bar{r} = .59, p \leq .01$). Therefore, a cumulative group relations measure was obtained by summing the variable scores over the three group measures.

Task Structure (TASKSTR)—An instrument developed by Lynch (1974) measured the extent that employees performed repetitive and

routine tasks.² A two-way ANOVA indicated that the structure of work tasks varied significantly between job levels and between hospital units.

Job Tension (TENSION)—An instrument developed by Kahn et al. (1964) measured the frequency that employees were bothered by stressful feelings of role ambiguity and conflict, work overload, inadequate resources and other stressful job conditions.

Job Performance (PERF)—Approximately three months after the employees completed the questionnaire the head nurses evaluated the recent performance of each subordinate using behavior description scales (Smith & Kendall, 1963; Tate, 1974). The scales rate observed nursing behaviors on five dimensions: knowledge and judgment, conscientiousness, skill in human relations, organization ability, and observational ability. These performance scales have been found to be generalizable across comparable nursing jobs in different organizations although slight modifications were made to some behavioral anchors to arrive at behavioral descriptions that were consistent with the responsibilities of different nursing positions and practices within the participating hospital (Borman & Vallon, 1974). Zedeck and Baker (1972) reported that these scales have convergent validity between raters but only marginal discriminant validity across dimensions. In this study, the average correlation among the five performance scores was ($\bar{r} = .76, p \leq .01$). A cumulative performance score was, therefore, determined by summing the ratings over the five performance dimensions.

Job Termination (TERM)—During the year following the administration of the questionnaire, 54 respondents (19 percent of the sample) terminated their employment at the hospital. The terminations were voluntary and excluded retirements, dismissals or leaves of absence granted for medical or educational reasons. A respondent's termination was scored as a nominal variable, 1 indicating termination and 0 indicating continued employment.

Data Analysis

Table 1 reports the internal reliability, coefficient alpha (Nunnally, 1967), and the correlation matrix for the leadership behavior, situation and criterion variables included in the structural model. The correlation matrix indicated that there was a relatively low degree of collinearity among measures within each variable set with the exception of the leader

²In an attempt at operationalizing Perrow's technology construct, Lynch (1974) found that three task structure factors loaded highly on a technology dimension. These factors included predictability of events, routineness of operations and insufficient knowledge. These three factors were comprised of seven specific items. In the present research, a factor analysis of these seven items indicated that there was only one common factor explaining 72 percent of the variance among these items. Only the four items, which comprised the original predictability and routineness factors, had significant factor loadings on the single common factor. Therefore, in the present research, the measure of task structure is cumulative only over these four items and represents a measure of predictability of events and routineness of operations.

TABLE 1
Intercorrelation Matrix Among Variables in Structural Model ($n = 209$)

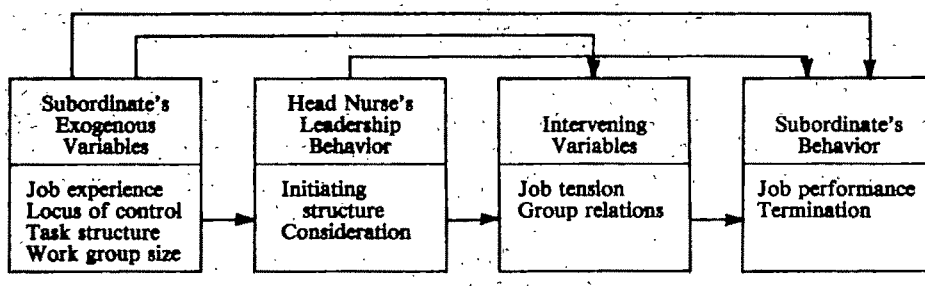
	Internal Reliability (α)	Exogenous		Leadership		Intervening		Subordinate's Behavior		
		X_2	X_3	X_4	X_5	X_6	X_7	X_8	X_9	X_{10}
<i>Exogenous Situational Variables</i>										
X_1 Job Experience										
X_2 Locus	.71	-.06	-.06	.00	-.09	-.14*	-.17*	.23**	-.02	-.22**
X_3 Group Size			.00	.09	.09	.15*	.15*	.05	-.14*	.06
X_4 Task Structure	.64		.01	.01	.00	-.07	.11	-.04	-.11	.03
<i>Leadership Behavior Variables</i>										
X_5 Initiating Structure	.82				.03	.06	.00	-.01	.00	-.05
X_6 Consideration	.88					.59**	-.26**	.28**	-.11	.11
<i>Intervening Situational Variables</i>										
X_7 Job Tension	.87						-.37**	.23**	-.28**	-.14*
X_8 Group Relations	.81							-.29**	.15*	.15*
<i>Subordinate's Behavior Variables</i>										
X_9 Job Performance									.05	-.11
X_{10} Terminations	.77									-.04

* $p < .05$ ** $p < .01$

behavior measures. The high correlation between initiating structure and consideration ($r_{12} = .59, p \leq .01$) was consistent with the findings of other studies (Larson, Hunt & Osborn, 1976). This high correlation is partially attributed to method variance and cannot be explained by relationships with other variables in the model.

The posited causal relationships between variables are illustrated in Figure 1. The Gestalt logic of the posited model is that the head nurse's leadership behavior can directly effect the subordinate's behavior and also have indirect effects which are mediated through the head nurse's leadership influence on the subordinate's job stress and work group relations. Likewise, the subordinate's individual attributes, task structure and group size may have an exogenous effect on the observed leadership relationships by influencing both the perceptions of the head nurse's leadership behavior and the subordinate's subsequent job performance and termination.

FIGURE 1
Posited Structural Model of Leadership Influence



To establish an identifiable recursive model, the assumption was made that there were no causal relationships among measures within each set of exogenous or intervening situational variables. There were no significant correlations among the exogenous variables, but the significant correlation between the two intervening variables ($r_{11} = -.29, p \leq .01$) raises some question concerning the validity of this assumption. It was beyond the scope of the present research, however, to test causal relationships between the concurrent measures of job tension and group relations. Thus, in developing the recursive equations for the posited leadership model, the two intervening variables were considered to have additive effects in explaining the subordinate's behavior.

The posited structural model can be expressed as a recursive set of six equations with each variable being expressed as a linear function of all preceding variables. In these equations, X_i is the measured variable in standardized form; P_{ji} is the path coefficient or partial regression coefficient between the dependent variable (X_i) and each independent variable

(X_j) in each equation (e.g., $P_{106} = \beta_{106.1234578}$); E_j is the residual error term associated with the predictive equation for each dependent variable; and the path coefficient associated with the residual term is determined by $\sqrt{1 - R_j^2}$ where j is the dependent variable in each equation and R^2 is the multiple correlation coefficient squared.

RESULTS

Table 2 presents the path coefficients for all paths in the complete model. The full model contained 36 paths and explained a total of 11 percent of the variance in the dependent variables. However, only 11 path coefficients were significant. To arrive at a more parsimonious model, the initial nonsignificant path coefficients were set equal to zero and the set of equations reanalyzed to arrive at estimates for the remaining path coefficients (Heise, 1975). Because of the large sample size, several of the statistically significant path coefficients had relatively small magnitudes indicated in Table 2. Therefore, after reanalysis of the reduced structural equations, only those significant path coefficients exceeding a value ($P_{\beta} \geq .15$) were retained in the path diagram illustrated in Figure 2 (Heise, 1969). The path coefficient associated with the unexplained error for each variable is reported directly below each variable name. The reduced model contained eight paths and explained 8 percent of the variance in the dependent variables. A chi-square test (Kim & Kohout, 1976) indicated that there was no significant difference between the full and reduced models in terms of their adequacy to explain variance in the dependent variables.

TABLE 2
Path Coefficients in Full Recursive Model

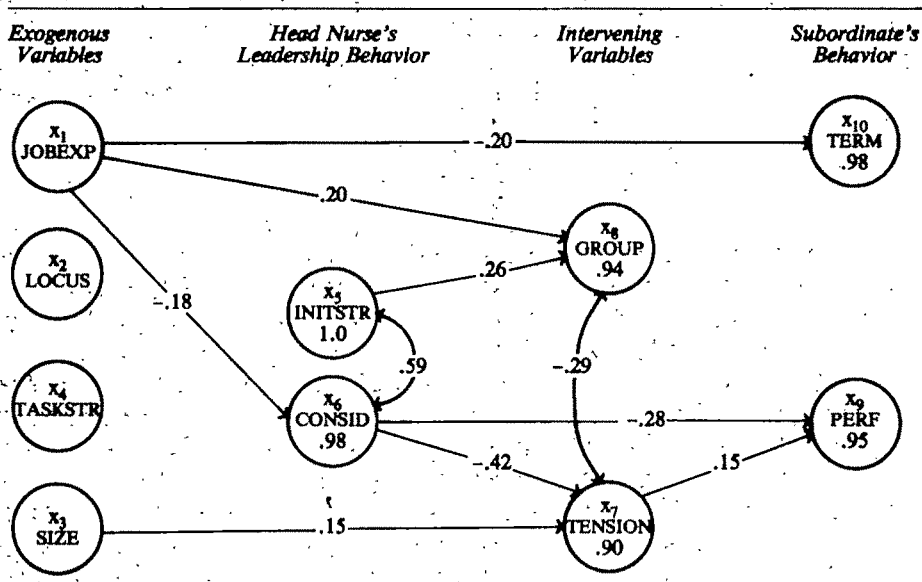
Independent Variables (X_i)	Dependent Variables (X_j)					
	X_1 INITSTR	X_2 CONSID	X_3 TENSION	X_4 GROUP	X_5 PERF	X_{10} TERM
X_1 JOBEXP	-.10	-.18**	-.11	.19**	-.12*	-.16*
X_2 LOCUS	.08	.13	.10	.10	.12*	.04
X_3 SIZE	.03	-.08	.14*	-.03	-.13*	.02
X_4 TASKSTR	.00	.05	-.06	-.01	.02	-.04
X_5 INITSTR			.07	.22**	.08	.11
X_6 CONSID			-.35**	-.08	-.32**	-.07
X_7 TENSION					.17*	.10
X_8 GROUP					.04	-.05
E_1 ERROR	.97	.97	.88	.93	.95	.96
R^2	.05	.06*	.22**	.13**	.10**	.07*

* $p \leq .05$

** $p \leq .01$

The reduced path diagram indicated that job experience and group size had significant exogenous effects in the structural model. The subordinate's job experience had direct effects on her perceptions of group relations ($P_{81} = .20$) and leader consideration ($P_{61} = -.18$). Thus, nursing

FIGURE 2
Path Diagram for Reduced Structural Model of Leadership Influence



employees who had worked longer in their present position reported greater cohesion and work enthusiasm among co-workers and less considerate behavior on the part of the head nurse. Likewise, job experience was the only variable having a direct effect on terminations ($P_{101} = -.20$). As expected, more experienced employees were less likely to terminate employment. Second, the size of the head nurse's staff had a direct effect on job tension ($P_{73} = .15$). This finding may be partially explained by the tendency to have a more heterogeneous grouping of nursing positions (e.g., RNs, LPNs, and aides) in larger groups than small groups. Status differences among positions and the delineation of specific job duties by position may result in perceived role ambiguity and conflict. This result could also reflect an artifact of having larger head nurse staff units during the day shift than in the evening or night shifts. Generally, there are more stressful job demands in providing diagnostic tests, patient treatments and nursing care during the day shift than other shifts.

Consistent with results reported in a longitudinal study (Greene & Schriesheim, 1977), the head nurse's initiating structure behavior had a positive effect on the subordinate's group relations ($P_{85} = .26$). The group relations, however, did not have a strong intervening effect on the subordinate's subsequent job performance or termination. In contrast, the head nurse's consideration had a direct effect on the subordinate's performance measure ($P_{96} = -.28$). Consideration also had an indirect effect on performance to the extent that consideration tended to reduce job tension ($P_{76} = -.42$). In this study, tension reduction was found to be

somewhat dysfunctional in terms of job performance criteria because of the direct positive relationship between perceived job tension and performance measures ($P_{97} = .15$). This finding corroborates the results of lab experiments (Weed, Mitchell & Moffitt, 1976) which suggested that consideration may be effective in creating a pleasant work environment, as evidenced by low tension, but may be less effective in terms of job performance criteria.

DISCUSSION

In interpreting the results of this study, one must remember the caveat that the validity of the proposed structural model rests with the underlying leadership theory and research evidence used to posit the causal linkages (Heise, 1969). The path analysis provided empirical support for a number of exogenous and intervening situational effects on leadership influence. However, in view of previous research evidence, the absence of strong exogenous effects for task structure and locus of control variables was of notable interest in this study. The absence of significant path coefficients does not necessarily imply that these exogenous situational variables do not affect the leader's influence on subordinates. These situational variables may interact with leadership behavior to explain a unique portion of variance in the subordinate's behavior that neither variable alone would explain. To examine the possibility of interactive effects, a moderated regression analysis (Allison, 1977) was made with the exogenous variables to test the importance of the (situation \times leadership behavior) term in explaining the subordinate's behavior. The only significant interactive effect that appeared was task structure with initiating structure ($F = 4.40$, $p \leq .05$) in predicting the subordinate's terminations. To analyze the nature of this interactive effect, the correlation between initiating structure scores and terminations was examined for subordinates reporting task structure scores above and below the median value. The correlations were ($r = .32$, $p \leq .01$) for the high task structure conditions and ($r = .04$) in the low task structure conditions. This interaction effect indicated that the head nurse's initiating structure had a significantly stronger effect on employee terminations in those situations where the tasks themselves are highly structured.

It is interesting to note that the reported relationships between the head nurse's leadership activity and her staff members' behavior were partly dysfunctional to the hospital organization. Her initiating structure behavior was related to nursing terminations, particularly in the structured task conditions. Likewise, the subordinate's perceptions of a highly considerate style of behavior were inversely related to the measures of her job performance. These results contrast sharply with the general conclusions drawn from previous studies that the head nurse's leadership behavior, particularly consideration behavior, was positively related to the staff member's self-reported job attitudes such as satisfaction (Jelinek &

Dennis, 1976). The findings of this study would indicate that a degree of caution should be exercised in drawing the conclusion that the head nurse's positive leadership influence on the nurses' job attitudes will necessarily carry over to a positive influence on their work behavior.

The findings of this study also indicated various processes by which situational variables affected the head nurse's leadership influence. Task structure was viewed as a moderator variable which interacts with the head nurse's initiating structure to explain variance in the subordinates' terminations. Job tension was viewed as an intervening variable which mediates the strength of the relationship between the head nurse's consideration and subordinates' performance. Lastly, the subordinate's job experience and the size of the work group were viewed as exogenous variables which explain variance in the subordinates' job termination, group relations and job tension independent of the leader's behavior.

This complex pattern of situational effects has important implications for future research directions. Previous research designs have frequently segmented the analysis of leadership influence by a-priori selecting a situational factor and then testing contingency hypotheses by comparing leadership effects in sample groups representing different levels of the situational factor. A recent review of leadership studies (Kerr et al., 1974) identified no less than 14 situational variables that have been found to moderate the effects of the leader's behavior. Thus an inherent limitation of extending these descriptive studies of leadership effects is that it has become increasingly difficult to account for all the various situational factors that may confound the comparison of leadership relationships in different sample groups.

The descriptive studies have also failed to provide an adequate Gestalt explanation of the underlying leadership process. It would be unlikely that the situational effects found in previous research act independently of each other. Therefore, it is important to analyze the relative impact of different situational factors by examining a comprehensive set of situational variables in a single study rather than piecing together the findings of independent studies. The present study presents an alternative paradigm for integrating some of the previous research findings in a structural model of the leadership influence process. There is, however, an apparent need to examine different structural relationships and more comprehensive models of leadership influence since the proposed model explained only 8 percent of the variance in the dependent variables.

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Questions of Causation in the Path-Goal Theory of Leadership¹

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This paper reports results of two studies which investigated elements of the current (House & Dessler, 1973; House & Mitchell, 1974) and initial (House, 1971) versions of the path-goal theory of leadership. The first constituted a replication and the second a longitudinal study which tested several assumptions about causation which underlie both versions of the theory. The findings largely supported the theory with the notable exception of the hypotheses concerning subordinate performance.

The study of leadership for more than a decade has focused on the development and testing of contingency theories—that is, theories which postulate conditions under which particular forms of leader behavior will be more effective than others. From an operational point of view, contingency theories, to the extent they are supported empirically, can provide inputs to the decisions a manager must make concerning the type of leader behavior he or she should emphasize in a particular situation. For example, the leader should have an understanding of the situations in which emphasis on the task will increase satisfaction of subordinates and, conversely, those situations in which this form of structuring behavior will negatively affect subordinate satisfaction.

One such contingency theory, the path-goal theory of leadership, was constructed by House (1971) and refined more recently by House and Dessler (1974) and by House and Mitchell (1974) from the earlier work of Georgopoulos, Mahoney, and Jones (1957) and Evans (1970) and from the numerous studies conducted using the initiating structure and consideration dimensions of leader behavior. This article reports results of two studies which provide partial tests of the theory. The first constitutes a test of elements of the current version of the theory (House & Dessler, 1974; House & Mitchell, 1974) and also the hypotheses concerning leader

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behavior and subordinate performance which were presented only in the initial (House, 1971) version of the theory. The second study tested by means of a longitudinal design several assumptions about causality which underlie elements of both versions of the theory.

REVIEW OF THE THEORY²

The path-goal theory of leadership, in its current form, sets forth two basic propositions. The first asserts that "one of the strategic functions of the leader is to enhance the psychological states of subordinates that result in motivation to perform or in satisfaction with the job" (House, 1971, p. 3). Stated more specifically, the leader's function consists of clarifying the goals of his subordinates, as well as the paths to these goals, enhancing subordinates' satisfaction with work itself, and providing valued extrinsic rewards contingent on performance.

The second proposition asserts that the particular forms of leader behavior that will accomplish this motivational function of the leader are situationally determined. At the theoretical level, House and Dessler (1974) have identified two classes of situational variables—subordinate characteristics and environmental forces—which affect the extent to which motivation can be accomplished by a specific leader behavior. Empirically, they have operationalized and tested the moderating effects of several task characteristics (environmental forces) on the relationships between leader behavior (initiating structure and consideration) and subordinate expectancies, role clarity, satisfaction, and performance. In the initial presentation of the theory, House tested five hypotheses concerning the moderating effects of task autonomy and job scope on the relationships between leader behavior, on one hand, and subordinate satisfaction and performance, on the other. While the hypotheses concerning subordinate satisfaction generally were supported, those involving subordinate performance were not. The theory in its revised form now incorporates task structure (a measure which encompasses both task autonomy and job scope) as a moderating variable, includes subordinate expectancies and role clarity in addition to satisfaction as dependent variables, but, interestingly, excludes subordinate performance (but only in House and Dessler's tests of the revised version of the theory).

STUDY NUMBER ONE

The first study reported here constitutes a replication of House and Dessler's Tests of the theory, excluding the subordinate expectancies³ but

²For a more thorough discussion of the theory and results of tests of the theory, see the reviews by House and Mitchell (1974) and Schriesheim and Von Glinow (1977).

³Measures of the subordinate expectancies were not obtained because of sensitivity expressed by management concerning the effects of probing perceptions of the performance-reinforcement contingencies.

including subordinate performance as assumed dependent variables. Following the current version of the theory, it was hypothesized that:

Hypothesis 1—Task structure will have a negative moderating effect on the relationship between instrumental leader behavior and the following dependent variables: intrinsic and extrinsic satisfaction of subordinates, (and) role clarity... Specifically, the lower the task structure, the higher will be the relationship between instrumental leader behavior and the dependent variables (House & Dessler, 1974, p. 18).

Underlying this hypothesis is the assumption that when tasks are highly unstructured (that is, when task stimuli are complex, uncertain, and ambiguous) and thus path-goal relationships are necessarily unclear, instrumental leader behavior (initiating structure) will help subordinates clarify their perceptions of task requirements and what others expect of them. Thus, House and Dessler contend that when tasks are unstructured, instrumental leadership should contribute to increased role clarity and satisfaction both with work and conditions extrinsic to the job. In the opposite condition, when tasks are highly structured, it is expected that instrumental leadership will further increase role clarity but also will be considered as redundant, unnecessary close supervision and thus a source of dissatisfaction.

Results of static correlational studies conducted by House and Dessler (1974) and, more recently, by Sims and Szilagyi (1975) and Schuler (1975) were able to support this hypothesis. Johnson and Stinson (1974), Szilagyi and Sims (1974), and Downey, Sheridan, and Slocum (1975), however, obtained correlational findings which run directly counter to the theory with respect to the relationships with role clarity and subordinate satisfaction. Johnson and Stinson suggest that the discrepant findings may have resulted from sample differences. Compared to House and Dessler, the subjects in their study represented higher occupational, hierarchical, and educational levels. A more recent investigation by Dessler and Valenzi (1977) failed to support this particular interpretation with respect to the moderating effects of occupational level on the relationship with satisfaction. However, occupational level, it should be noted, is not always highly correlated with task structure (e.g., in research and development work and in many administrative staff positions).

One must also question the particular measures used to assess leader behavior in the research noted thus far. The Supervisory Behavior Description Questionnaire (Fleishman, 1957), used by Downey et al. (1974) and Szilagyi and Sims (1974), contains initiating structure items which represent autocratic, punitive, and production-oriented leader behaviors, none of which one would expect to be positively related to subordinate satisfaction. These items are also poorer operationalizations of the theory's constructs than the initiating structure scale of the Leader Behavior

Description Questionnaire—Form XII (Stogdill, 1965), utilized in part or in toto in the remainder of the studies noted in this review.

Hypothesis 2—Task structure will have a positive moderating effect on the relationship between supportive leader behavior and the following dependent variables: intrinsic and extrinsic satisfaction of subordinates, . . . and role clarity. Specifically, the lower the task structure, the lower will be the relationships between supportive leader behavior and the dependent variables (House & Dessler, 1974, p. 19).

This hypothesis is based on the assumption that when the task is unstructured (more complex and varied), it is likely to become more intrinsically satisfying, or self-reinforcing, in part because of the challenge it presents. Conversely, a highly structured task is conceived of as being so routine as to induce frustration and dissatisfaction. Supportive leader behavior (consideration), it is contended, should help reduce the frustration and help offset the dissatisfying nature of structured tasks. At the empirical level, this hypothesis has received support in a number of studies—House (1971), House and Dessler (1974), Johnson and Stinson (1974), Downey et al. (1975), Szilagyi and Sims (1974), and Sims and Szilagyi (1975).

Hypothesis 3—Job autonomy and job scope (task structure) will have negative moderating effects on the relationships between leader behavior (initiating structure and consideration) and subordinate performance. Specifically, the less structured the task is, the stronger will be the relationship between leader behavior and subordinate performance (House, 1971, pp. 328-329, represents combining of hypotheses 2 and 5).

This hypothesis is based on the expectation that subordinate performance will be more heavily dependent on assistance, guidance, and support from the leader when tasks are unstructured (complex, varied, and ambiguous). On the other hand, when tasks are structured, such structuring and supportive behavior by the leader would seem to be unnecessary and thus have no effect on performance. This particular hypothesis has been tested three times (House, 1971; Szilagyi & Sims, 1974; and Downey et al., 1975) and has yet to be supported.

Method

Sample—The sample consisted of 119 leader-subordinate dyads employed in the research and development divisions of an airframe manufacturer ($n=41$), an electronics firm ($n=34$), and a paper products manufacturer ($n=34$). In each dyad, the leader was a first-line manager and the leader's immediate subordinate was an engineer, scientist, or technician.



Measures—The measures of leader behavior were identical to those used by House and Dessler. Seventeen items were used, 14 of which were taken from the Leader Behavior Description Questionnaire—Form XII (Stogdill, 1965a): items 3, 4, and 6 through 9 of the consideration factor and numbers 11, 12, and 15 through 20 of the initiating structure factor. [Item numbers refer to those reported in Schriesheim and Stogdill (1975), which includes the full set of items for the LBDQ—XII.] House and Dessler added three new items: two to the consideration scale (“He helps me overcome problems which stop me from carrying out my task” and “He helps me make working on my tasks more pleasant”) and one to the initiating structure scale (“He explains the way my tasks should be carried out”).

The scales were revised to remove the punitive, autocratic, and production-oriented items and, indeed, they do seem to better reflect the conceptions of considerate-supportive and role clarifying behavior within the path-goal theory context (Schriesheim & Von Glinow, 1977). These scales were renamed, supportive leader behavior (SLB) and instrumental leader behavior (ILB), respectively, by House and Dessler and refer (pp. 39-40) to behavior that is “friendly, approachable, and considerate” and instrumental [that is, “directed at clarifying (subordinate role) expectations”]. House and Dessler reported scale reliabilities of .72 and .76 (Kuder Richardson Formula 20) and estimates of internal consistency of .72 and .78 for ILB with two samples and corresponding reliabilities of .82, .79, .74, and .69 for SLB. In the present study, Spearman-Brown coefficients of internal reliability of .71 and .78 were obtained for the ILB and SLB measures, respectively.

The scale developed by House and Dessler was utilized to measure task structure. This 10-item scale was designed to assess the degree to which task stimuli and execution of rules and procedures are simple, repetitive, and unambiguous. House and Dessler have reported estimates of internal consistency of .69 and .65 for two different samples.

Role clarity was measured by the instrument developed by Rizzo, House and Lirtzman (1970) and also utilized by House and Dessler. Rizzo et al. developed a set of items which stress the clarity and predictability of role demands and behavioral requirements. They have reported estimates of internal consistency of about .80 when the instrument was administered to two different samples.

Following House and Dessler, subordinate satisfaction, both intrinsic and extrinsic, was assessed by means of Stogdill's (1965b) Job Expectation Questionnaire. The four-item work satisfaction factor was utilized to measure intrinsic satisfaction, while items pertaining to pay, advancement, and prestige expectations were combined to provide a single measure of extrinsic satisfaction. The reliability of the instrument is well within the acceptable range for research purposes; reliability (split-half) coefficients for six different samples were all reported to be about .80.

The subordinate's performance was evaluated by two peers. To ensure that the raters were knowledgeable about the subordinate's performance, the leader was asked to provide a list of several of the subordinate's peers who would be familiar with the subordinate's performance. Selection of the two peers who rated the subordinate's performance was made randomly from this list by the investigator. Identical seven-point scales were devised for the raters to indicate their evaluations of both the quality and quantity of the subordinate's performance. The responses were scaled one (extremely low quality or quantity of work) to seven (extremely high quality or quantity of work). Analysis of the ratings, however, revealed a high level of agreement between raters; the values of r corrected by the Spearman-Brown formula were .75 and .79 for quality and quantity of performance. Combining the ratings on both performance dimensions resulted in a Spearman-Brown coefficient of .78 (all p 's < .001). Both sets of peer ratings were then combined in part because the high correlations between quality and quantity of performance raise doubts about the discriminant validity of the measures and to provide one, more comprehensive, measure of the subordinate's performance. The range of the averaged peer ratings extended from 2.29 to 6.75.

Analysis—Both the method of analysis and measurement of variables, with the exception of deleting the expectancies and adding the performance measure, deliberately duplicated those used by House and Dessler. The data were analyzed by trichotomizing respondents on the basis of their scores on task structure and analyzing the correlations between the leader behavior scores and role clarity and satisfaction scores. Since instrumental and supportive leader behavior were found to be significantly intercorrelated ($r = .33$, $p < .01$), partial correlations were employed in the analysis.

Results

The results of the tests of the three hypotheses, reported in Table 1, are generally supportive of the theory with the exception of the relationships with subordinate performance. The results indicate that task structure moderated the relationships between instrumental leader behavior and both intrinsic and extrinsic satisfaction and in the direction hypothesized. The correlations with both of these variables were positive in the low task structure condition and negative in the high task structure condition (p 's extending from $> .10$ to $> .01$). Similar support was provided by the analysis of the moderating effects of task structure on role clarity. The only significant correlation was obtained in the low task structure condition ($r = .36$, $p < .05$).

As can be noted in Table 1, the results also generally support hypothesis 2, with the exception of the relationship with extrinsic satisfaction. Task structure moderated the relationships between supportive leader behavior and both intrinsic satisfaction and role clarity and in the predicted

TABLE 1
**Correlations Between Leader Behavior and Subordinate Satisfaction,
 Role Clarity, and Performance Moderated by Task Structure**

	Task Structure		
	Low (n=39)	Medium (n=40)	High (n=40)
<i>Instrumental Leader Behavior and</i>			
Intrinsic Satisfaction	.30**	.17	-.29*
Extrinsic Satisfaction	.27*	.19	-.33**
Role Clarity	.36**	.19	.17
Performance	.20	-.24	-.22
<i>Supportive Leader Behavior and</i>			
Intrinsic Satisfaction	.20	.25	.40***
Extrinsic Satisfaction	.17	.30**	.19
Role Clarity	.11	.27*	.26
Performance	.25	.13	.10

* $p < .10$

** $p < .05$

*** $p < .01$

direction. The correlations were more positive under conditions of high task structure and lower under low task structure. The correlations involving role clarity, however, were relatively weak.

The results concerning hypothesis 3, the relationships between both dimensions of leader behavior and subordinate performance, were generally not supported; none of the correlations was significant.

STUDY NUMBER TWO

While the results obtained in the first study, with the notable exception of the relationships with subordinate performance, are very consistent with the theory and House and Dessler's findings, they do not, however, constitute adequate support of the theory. Underlying the theory are several assumptions about causality which neither the first study, nor the House and Dessler study, and, for that matter, only one other reported investigation of the theory have tested. Following the logic presented in support of the theory earlier in this paper and in more depth by House (1971), House and Dessler (1974), and House and Mitchell (1974), the theory is more directly concerned with specifying conditions (operationally, degrees of task structure) under which leader behavior will *cause* subordinate satisfaction, role clarity, performance and the expectancies. All but one of the reported investigations of these relationships have utilized static correlational analysis which, unfortunately, provides little or no basis for inferring causality. For example, a highly significant correlation between instrumental leader behavior and subordinate performance under some level of task structure indicates only that the two variables are related at that particular level of task structure. Initiating structure may have caused

changes in subordinate performance or, conversely, subordinate performance may have caused variance in leader behavior, or causation may have been reciprocal, or a third or additional variable may have caused the two variables in question to covary. Static correlational analysis provides insufficient information to assess any of these possible explanations of the significant correlation.

The one other reported study of the theory which did *not* employ static correlational procedures was the longitudinal investigation conducted by Downey, Sheridan, and Slocum (1976). Their results, however, did not support the theory with two possible exceptions. In the low task structure condition, there were some indications that both initiating structure and consideration positively affected subordinates' performance. Downey et al.'s measures of leader behavior, however, differed from those utilized by House and Dessler and in the present study. Their measures consisted of the initiating structure and consideration factors and the Supervisory Behavior Description Questionnaire (Fleishman, 1957), and, as Schriesheim and Von Glinow (1976) among others have noted, these particular measures include items which represent autocratic, punitive, and production-oriented leader behaviors—none of which are operationally consistent with the supportive and instrumental leadership constructs of the theory.

While use of the SPDQ measures may have limited this test of the theory, there are at least two other limitations—another measurement problem and one concerning the time interval between measurements. First, use of annual salary increase as the measure of job performance for the managerial sample (low task structure condition) is highly suspect since there are known causes of the magnitude of annual salary increases (e.g., seniority, position within rate range, equity considerations, cost of living adjustments, budget constraints) other than performance. In other words, the extent to which performance was actually measured is uncertain. Second, the time lag between measurements was *one year*—a time interval which one might suspect was determined by the availability of the annual salary increase data. While the appropriateness of a given time interval is at least in part an empirical question, it seems quite unrealistic to expect that on the average it would take as long as one year for some aspect of leader behavior to affect subordinate satisfaction, much less subordinate performance, and vice-versa. It is worthwhile noting at this point that Greene's (1975) longitudinal study of leader-subordinate behavior provided significant results and with one- and two-month lags. Of equal relevance here are the significant, supportive results obtained by Sims and Szilagyi (1975) in their investigation of causation in the path-goal theory. Their study used path analytic procedures, but with a static design! Thus, one may conclude that the lack of results obtained by Downey et al. may well be attributed to an inappropriate time interval. In other words, the "effect," if such did occur, probably had already taken place by the time they collected their time two data.

Method

Study Number Two was a longitudinal study, with a three-month time interval between measurements, which sought to investigate the causal nature of the relationships between leader behavior (initiating structure and consideration) and (1) subordinate satisfaction, (2) role clarity, and (3) subordinate performance—all moderated by task structure. It used the cross-lagged correlational model, the Frequency-of-Change-in-Product-Moment Technique, (FCP), and "corrected" dynamic correlations as analytical procedures for testing the assumptions about causality in the path-goal theory of leadership.

Sample—The sample consisted of 60 leader-subordinate dyads representing the financial and marketing divisions of a chemical products firm. All respondents were salaried and performed either managerial, professional, sales, or administrative-clerical tasks.

Measures—The cross-lagged correlational, FCP, and dynamic correlational techniques require that identical measures of the variables—leader behavior and subordinate satisfaction, role clarity, performance, and task structure—be obtained at two points in time with the same respondents. In the present study, the measures were obtained *three months* apart.

The instruments utilized to measure the variables were identical to those described in study number one with the exception of the satisfaction measure which consisted only of the intrinsic satisfaction items. As was done in the first study, the performance ratings by both raters were averaged for each subordinate because of the high level of interrater agreement. The Spearman-Brown coefficients were .72 and .81 for quality and quantity of performance, respectively, and .76 when these ratings were combined (all p 's < .001). The data were analyzed by trichotomizing the sample on the basis of a median split on the initial (time one) task structure scores.

Analytical Procedures

Cross-Lagged Correlational Model—The cross-lagged correlational model was developed initially by Simon (1954) and has been refined and successfully applied more recently by a number of researchers, e.g., Campbell (1963), Pelz and Andrews (1964), Vroom (1966), Lawler (1968), and Greene (1973a). Underlying this technique and specifically the time-interval requirement is the assumption that if a variable (C) causes another variable (E) there will be lag in time between the two variables. For example, if the leader's emphasis on instrumental behavior causes subordinate performance, the present (time one) state of instrumental leader behavior should be more highly related to the future (time two) state of performance. Comparisons of the correlations between initiating structure and the three states of performance thus provide a basis for assessing the relative magnitudes of influence that the two variables have on one another.

The most serious problem encountered with the cross-lagged correlation technique, noted by Yee (Yee, 1968; Yee & Gage, 1968), is that it fails to limit the number of inferences which can be made. If, for example, the relationship between instrumental leader behavior (x) in time one and performance (y) in time two ($r_{x_1y_2}$) is significant and substantially stronger than the relationship between time one performance and time 2 instrumental leader behavior ($r_{y_1x_2}$), it usually is inferred, using the cross-lagged correlational technique, that instrumental leader behavior caused performance. Conversely, the finding that $r_{y_1} > r_{x_1y_2}$ indicates that performance caused instrumental leader behavior. The problem, identified initially by Rozelle (1965), arises from the fact that there are at least two additional inferences which are possible. The first finding, $r_{x_1} > r_{y_1x_2}$, could result not only from (1) instrumental leader behavior having greater influence to increase the correlation between instrumental leader behavior and performance but also from (2) performance having greater influence to decrease the correlation between the two variables. Similarly, the second finding, $r_{y_1x_2} > r_{x_1y_2}$, could be attributed to either (3) instrumental leader behavior causing the correlation to decrease or (4) performance causing it to increase. In other words, there are at least four, not two rival hypotheses: A increases B, A decreases B, B increases A, and B decreases A. In summary, the major problem encountered with cross-lagged correlations is that it is not possible to distinguish between the source and direction of influence of the two correlated variables, that is, to determine which variable had the greatest influence and whether it increased the correlation (positive effect) or decreased the correlation (negative effect).

The Frequency-of-Change-in-Product-Moment Technique—The FCP technique was devised by Yee in part to overcome this weakness in the cross-lagged correlation technique. The FCP technique requires that the data collected for *each* individual respondent be placed into *one* of four categories. Using the relationship between instrumental leader behavior (ILB) and performance (P) as an example, the data for each subject were placed into the ILB+, ILB-, P+, or P- category according to the following procedures:

1. The time one and time two raw scores for instrumental leader behavior and performance for each respondent were converted to standard scores. In other words, $z = (x - \bar{x})/s$ were computed for each score.
2. The direction of influence, positive or negative, was identified for each case by determining if the cross-product of the time two z scores was greater or less than the cross-product of the time one z scores. If the cross-product of the time two z scores, $Z_{ILB_2P_2}$, was greater than $Z_{ILB_1P_1}$, the direction of influence was considered to be positive, that is, the interaction between initiating structure and performance increased the overall correlation. The opposite condition, when the cross-product of the time two z scores was less, indicated a negative direction of influence, that is, the interaction between instrumental leader behavior and performance

decreased the overall correlation between instrumental leader behavior and performance.

3. The source of influence was ascertained by examining the cross-lagged z products for each case. Where the direction of influence was positive, the variable whose time one measure was part of the larger cross-lagged z product was considered as the source of influence. On the other hand, if the direction of influence was negative, the variable whose time one measure was part of the smaller cross-lagged z product was considered as the source of influence. In summary:

If the direction of the change was *positive* (that is, $z_{ILB_2P_2} > z_{ILB_1P_1}$) and if $z_{ILB_1P_2} > z_{P_1ILB_2}$, then initiating structure was identified as the source of the positive influence (denoted by ILB+). Conversely, if $z_{P_1ILB_2} > z_{ILB_1P_2}$, performance was the source of the positive influence (denoted by P+).

If the direction of the change was *negative* (that is, $z_{ILB_1P_1} > z_{ILB_2P_2}$) and if $z_{ILB_1P_2} > z_{P_1ILB_2}$, then instrumental leader behavior was the source of the negative influence (denoted by ILB-). However, if $z_{P_1ILB_2} > z_{ILB_1P_2}$, performance is considered the source of the negative influence (denoted by P-).

4. After each of the cases was classified into one of the four categories—ILB+, ILB-, P+, or P-, chi square tests were computed to determine if the number of cases placed in a given category differed significantly from the number placed in the other three categories. Chi square was computed using the general formula and Yates' correction for continuity.

"Corrected" Dynamic Correlational Analysis—Another limitation of the cross-lagged correlational model, and, for that matter, any longitudinal analytical procedure, is the inability to assess the possibility of a third or additional variable causing the two variables in question (e.g., X and Y) to covary. In order to overcome this problem, Vroom (1966) proposed utilizing the dynamic correlation coefficient, which is calculated by correlating the change in X from time one to time 2 with the change in Y over the same time interval. According to Vroom, the stronger this correlation is, the lower the probability that the covariance in X and Y can be attributed to the effects of a third variable(s). Dynamic correlations, however, may be biased estimates of the actual changes. This particular problem, which is discussed in more detail by Campbell (1963) arises because of the tendency of scores obtained at time two to regress toward the mean of the time one scores whenever error is present in both measurements (e.g., respondents with extreme scores at time one having less extreme scores at time two). When such regression to the time one mean does occur, the time one scores on a given variable will be negatively correlated with the change scores on the same variable. In order to preclude this form of bias from affecting the results, the residual gain scores were used to control for the variance among the initial scores on each variable. This "correction" was accomplished by means of Cronbach

and Furby's (1970) procedure—using partial correlations to compute the dynamic correlation, holding the initial scores on both variables constant.

Results and Discussion

Dynamic Correlations and Test-Retest Reliabilities—As can be noted in Tables 2-A and 3-A, few problems were encountered in the analysis using the dynamic correlational technique. All of the "corrected" dynamic coefficients were significant (the values of r extended from .39 to .77, all p 's < .05), but none was strong enough to preclude the possibility of other variables affecting the cross-lagged results obtained. The lowest correlations (.39, .47, .49, and .50) were obtained in analyses of the relationships with subordinate satisfaction and performance, and predominately in the low task structure condition. These findings, however, were not unexpected given that there are known causes of satisfaction (e.g., other forms of rewards, the question of equity, et cetera) and causes of performance (both motivational and nonmotivational) other than the leadership variables investigated. The measures of stability of the variables over the three-month time interval—the correlations between the same variables from time one to time two (e.g., $r_{ILB_1ILB_2}$)—extended from .49 to .79 (all p 's < .01) in the three task structure conditions.

Relationships with Instrumental Leader Behavior—Analysis of the data using the cross-lagged correlational technique, presented in Table 2-A, revealed the pattern of correlations one would expect if task structure determined the extent to which the leader's emphasis on instrumental behavior (ILB) caused subordinate satisfaction (S). The correlations, while very moderate, were in the direction predicted by the theory. The strongest correlations were in the cross-lagged coefficients in both the low task structure condition, where $ILB \rightarrow S$ ($r_{x_1y_2}$) = .40 (p < .10) and $S \rightarrow ILB$ ($r_{y_1x_2}$) = .20, and in the high task structure condition, where ILB had stronger and predicted negative effects on satisfaction ($r_{x_1y_2}$ = -.35 and $r_{y_1x_2}$ = -.10). None of the correlations in the medium task structure condition even approached significance. Thus, these results offer some support of the proposition that instrumental leader behavior causes subordinate satisfaction when tasks are unstructured but leads to dissatisfaction when tasks are structured.

Results of the FCP analysis concerning these relationships, reported in Table 2-B, are consistent with the cross-lagged correlational results and provide additional information concerning the source and direction of causal influence. In the low task structure condition, ILB was the source of causal influence (χ^2 = 5.06, p < .05). Furthermore, the direction of influence of ILB was to increase the correlation, and it did so to a greater degree than did subordinate satisfaction (ILB+ = 12, S+ = 3, χ^2 = 4.27, p < .05). Similar, although marginally stronger results, were obtained in the high task structure condition. Here, instrumental leader behavior was a source of dissatisfaction (χ^2 = 6.05, p < .05), and

TABLE 2
Longitudinal Results of Relationships Involving Instrumental Leader Behavior (ILB)

Assumed Dependent Variable (Y)	A. Cross-lagged Correlational Results									
	Low Task Structure (n=20)			Medium Task Structure (n=20)			High Task Structure (n=20)			Dynamic r
	r ₁₂	r ₂₁	r ₁₂	r ₂₁	r ₁₂	r ₂₁	r ₁₂	r ₂₁	r ₁₂	
Satisfaction	.21	.26	.40*	.20	.10	.22	.13	.25	.35	.60**
Role Clarity	.35	.39*	.60***	.30	.37	.43**	.20	.07	.12	.55***
Performance	.30	.25	.33*	.20	.15	.14	-.36*	-.18	-.10	.61***

Relationship	B. Frequencies of Change in Product-Moment (PCP) Results									
	Low Task Structure (n=20)			Medium Task Structure (n=20)			High Task Structure (n=20)			Values of Chi Square
	Frequencies	ILB+	ILB-	Frequencies	ILB+	ILB-	Frequencies	ILB+	ILB-	
ILB and Subordination (S)	12	3	2	11	4	6	12	4	3	1
ILB and Role Clarity (RC)	15	3	1	11	4	3	5	3	7	1
ILB and Performance (P)	6	4	2	5	5	8	1	4	12	3

H1: (ILB+) + (S-) > (S+) + (ILB-)	4.27**	0.02	0.00	0.00	0.00	0.00	6.05**	0.00	0.00	0.80
H2: (ILB+) + (RC-) > (RC+) + (ILB-)	11.23***	0.25	3.90*	4.05**	0.17	0.17	4.05**	0.00	0.00	0.90
H3: (ILB+) + (P-) > (P+) + (ILB-)	0.00	1.13	2.5	1.25	0.57	0.31	4.05**	7.69***	0.00	0.00

*p < .10
 **p < .05
 ***p < .01

further, this variable increased the *negative* correlation with subordinate satisfaction ($ILB+ = 2$, $S+ = 3$, $\chi^2 = 4.05$, $p < .05$).

As indicated in Table 2-A, the correlations testing the relationships between instrumental leader behavior and role clarity (RC) were very supportive of the theory. The "instrumental leader behavior-causes-role clarity" cross-lagged coefficients in *both* the *low* and *medium* task structure conditions were significant, stronger than the respective time one and time two static coefficients, and both $ILB \rightarrow RC$ coefficients were substantially stronger ($r = .60$, $p < .01$; $r = .43$, $p < .05$) than the corresponding $RC \rightarrow ILB$ coefficients (r 's = .26 and .20). Where tasks were structured (high task structure group), none of the correlations were significant. This particular finding, however, makes sense in terms of the theory since instrumental leader behavior would not be expected to have much of an effect on subordinates' perceptions of role clarity when their jobs are already well structured.

Consistent with the correlational results, the FCP results, reported in Table 2-A, provide strong indications that instrumental leader behavior was the causal variable ($\chi^2 = 11.25$, $p < .01$, in the low task structure condition; $\chi^2 = 4.05$, $p < .05$, in the medium task structure condition) and further that ILB had significantly more positive effects on the correlations obtained than did role clarity ($\chi^2 = 6.72$, $p < .05$ and $\chi^2 = 3.50$, $p < .10$, in the low and medium task structure conditions, respectively). Again, none of the results even approached significance in the high task structure group. Thus, the apparent implications from results of testing both sets of hypotheses thus far reported are that the leader should emphasize instrumental behavior only when the subordinate's task is ill defined and that such leader behavior in the opposite condition—when the subordinate's task is structured—may be dysfunctional.

In contrast to the previously reported results, results of the analysis of the relationship between instrumental leader behavior and subordinate performance provide evidence which contradicts the theory. As can be noted in Table 2-A (last row), the only significant results obtained in the cross-lagged correlational analysis were the "subordinate performance-causes-instrumental leader behavior" coefficients ($r_{y_1x_2}$) of $-.36$ and $-.42$ ($p < .05$) obtained in the medium and high task structure conditions, respectively. The negative signs of these coefficients under both task structure conditions further suggest that low performance on the part of the subordinate leads to increased instrumental, or role clarifying, behavior on the part of the leader to reduce emphasis on such behavior. This particular interpretation of these results is consistent with the findings and theoretical propositions advanced by Lowin and Craig (1968) and Greene (1975). This interpretation is further reinforced by the FCP results, presented at the conclusion of Table 2-A, but only in the high structure condition. Here, it can be noted, the source of causal influence was subordinate performance and not instrumental leader behavior ($\chi^2 = 4.05$, $p < .05$), and further, the effect of subordinate performance was to

increase the negative correlation between the two variables ($P+ = 12$, $ILB+ = 1$, $\chi^2 = 7.69$, $p < .01$).

Only in the low task structure condition was the $ILB \rightarrow P$ cross-lagged coefficient, as reported in Table 2-A, in the direction predicted ($r_{x_1y_2} = .25$). This correlation, combined with a corresponding $P \rightarrow ILB$ coefficient of $-.23$, does suggest the possibility that when the task is unstructured, the relationship between instrumental leader behavior and subordinate performance may be reciprocal. As can be noted in Table 2-A, none of the FCP results obtained in the low task structure condition even approached significance—and these are exactly the kind of results that would be expected if causation between these two variables were reciprocal. However, given the low magnitudes of the two cross-lagged correlations (r 's of $.25$ and $-.23$), this particular interpretation must be considered quite speculative.

Relationships with Supportive Leader Behavior—In comparison to the findings just discussed, results of the analysis of relationships between supportive leader behavior and subordinate satisfaction, presented in Table 3-A (first row), were quite supportive of the theory. All of the $SLB \rightarrow S$ cross-lagged correlations were in the direction predicted and the coefficients in the *medium* and *high* task structure conditions were significant (r 's = $.42$, $p < .05$, and $.55$, $p < .01$, respectively) and considerably stronger than the corresponding $S \rightarrow SLB$ coefficients (r 's = $.20$ and $.24$). The strongest correlation, the $SLB \rightarrow S$ coefficient of $.55$, was obtained in the high task structure condition consistent with the theory. According to the theory, one would predict leader supportiveness would have stronger effects when the subordinate's task is well defined, since definition of task requirements does not constitute a problem or a source of dissatisfaction for the subordinate as it may well do when the task is ill-defined. As the reader may note, the FCP results, presented at the outset of Table 3-B, are perfectly consistent with the cross-lagged correlational results both in terms of significance and differences in magnitude of effects among task structure conditions. Thus, one can infer from these findings that supportive leader behavior caused subordinate satisfaction, that supportiveness acted to increase the correlation between these two variables, and further, the effects of supportive leader behavior were greater the more structured subordinates' tasks were.

With the exception of the results concerning instrumental leader behavior and performance, the findings reported thus far have been supportive of the theory. However, results of tests of the two remaining relationships were either inconclusive or ran directly counter to the theory. None of the cross-lagged correlations between supportive leader behavior and role clarity, reported in Table 3-A, were significant (the strongest was the $SLB \rightarrow RC$ coefficient of $.30$, obtained in the high task structure group). These findings, when combined with the totally insignificant FCP results, presented in Table 3-B, offer no indications of causality. None of

TABLE 3
Longitudinal Results Involving Supportive Leader Behavior (SLB)

Assumed Dependent Variable (Y)	A. Cross-lagged Correlational Results									
	Low Task Structure (n = 20)					Medium Task Structure (n = 20)				
	r ₁₂ t ₁	r ₁₂ t ₂	r ₁₂ t ₃	r ₁₂ t ₄	Dynamic r	r ₁₂ t ₁	r ₁₂ t ₂	r ₁₂ t ₃	r ₁₂ t ₄	Dynamic r
Satisfaction	.17	.22	.28	.18	.39**	.20	.27	.42**	.29	.50***
Role Clarity	.10	.12	.09	.07	.37***	.12	.20	.17	.20	.59***
Performance	.30	.21	.23	.36*	.46**	.30	.25	.25	.29	.63***

Relationship	B. Frequencies of Change in Product-Moment (PCP) Results									
	Low Task Structure (n = 20)					Medium Task Structure (n = 20)				
	Frequencies	Values of Chi Square	Frequencies	Values of Chi Square	Frequencies	Values of Chi Square	Frequencies	Values of Chi Square	Frequencies	Values of Chi Square
SLB and Satisfaction (S)	SLB+ SLB- S+ S- 9 4 4 3	H1 ^a 1.25	SLB+ SLB- S+ S- 13 2 2 3	H1 ^a 4.03**	SLB+ SLB- S+ S- 15 2 2 2	H1 ^a 8.47***	SLB+ SLB- S+ S- 15 2 2 2	H1 ^a 8.47***	SLB+ SLB- S+ S- 15 2 2 2	H1 ^a 8.47***
SLB and Role Clarity (RC)	SLB+ SLB- RC+ RC- 8 3 5 4	H2 ^b 0.05	SLB+ SLB- RC+ RC- 5 5 4 6	H2 ^b 0.00	SLB+ SLB- RC+ RC- 4 4 8 4	H2 ^b 0.45	SLB+ SLB- RC+ RC- 4 4 8 4	H2 ^b 0.75	SLB+ SLB- RC+ RC- 4 4 8 4	H2 ^b 0.75
SLB and Performance (P)	SLB+ SLB- P+ P- 4 3 10 3	H3 ^c 1.25	SLB+ SLB- P+ P- 2 4 11 3	H3 ^c 1.79	SLB+ SLB- P+ P- 2 4 11 3	H3 ^c 2.45	SLB+ SLB- P+ P- 2 4 11 3	H3 ^c 2.45	SLB+ SLB- P+ P- 2 4 11 3	H3 ^c 2.45

^aH1: (SLB+) + (SLB-) > (S+) + (S-)
^bH2: (SLB+) + (SLB-) > (RC+) + (RC-)
^cH3: (SLB+) + (SLB-) > (P+) + (P-)

*p < .10
 **p < .05
 ***p < .01

the tests of this hypothesis approached significance, and the patterns of results were contradictory with respect to predicted directions.

Both results of the cross-lagged correlational and FCP analyses, interestingly offer rather strong indications that subordinate performance caused supportive leader behavior, *almost* regardless of the extent to which subordinates' tasks were structured (although it is apparent upon examining these results in Table 3 that such indications of causation were considerably weaker in the low and medium task structure conditions). The P→SLB coefficients were significant (r 's = .36, $p < .10$; .43, $p < .05$; .54, $p < .01$) and substantially stronger than their counterpart SLB→P coefficients (r 's = .21, .25, .26) in the low, medium, and high task structure conditions. None of the static coefficients even approached significance. Consistent, although generally less significant results were obtained using the FCP technique, as revealed at the conclusion of Table 3-B. Here, the results suggest that performance and not supportiveness was the source of influence, but these results were significant only in the high task structure group, where $\chi^2 = 4.05$ ($p < .05$). Performance, however, was found to have significantly more positive effects than supportiveness on the correlations obtained in both the medium ($\chi^2 = 4.92$, $p < .05$) and high ($\chi^2 = 6.67$, $p < .01$) task structure groups. Both sets of findings thus indicate, in direct contradiction to the theory [but consistent with Lowin and Craig's (1968) and Greene's (1975) findings], that expressions of friendship and support by the leader were considerably more sensitive to subordinates' performance than their performance was to this form of leader behavior.

Limitations

These particular findings, in addition to those reported earlier, need to be considered with some caution since this investigation is not without potential limitations. With exception of the performance measure, all measures were self-reported by the respondent. Thus, the possibility exists of response-set affecting the results obtained. In a longitudinal design, one would normally suspect existence of such a problem if the static (time one and time two) correlations were particularly strong. This was not the case in the present study; it was the cross-lagged correlations that were strong. One could nonetheless contend, particularly when performance (and feedback on performance) is a variable, that there is a time lag between the respondent's perceptions of performance, the attributions made by the respondent, and their potential effect on subsequent attitudes and perceptions of other objects (e.g., work, supervision, and other organizational factors). This is essentially the conclusion that Staw (1975) made on the basis of his controlled experiment in which the "treatment" was positive and negative feedback on performance. However, the extent to which this kind of bias was a factor in study number two is debatable. The only *direct* test of such bias was provided by Staw's experiment where the effects of

performance feedback on perceptions of other objects was made almost immediately after the feedback was provided. In the present study, performance feedback was not a "treatment," per se, and was at best random (given that performance was measured by confidential peer appraisals). Furthermore, the time-lag between measurements was sufficiently long (three months). Indeed, Staw's reference is to interpretation of static correlational studies, and longitudinal designs, he suggests (p. 430), constitute one way of reducing the problem.

CONCLUSIONS

Assuming that the results were not significantly affected by response-set, the findings of this research can be viewed as generally supportive of the theory with two notable exceptions: (1) the insignificant results concerning the relationships between supportive leader behavior and role clarity and (2) the strong indications found in the second study that subordinate performance caused variance in leader behavior, almost regardless of task structure. The first exception, particularly if one were to find insignificant results in a replication of this study, suggests that the hypothesized relationship between supportive leader behavior and role clarity be deleted from the theory. House and Dessler (1974) provide little rationale for such a hypothesis nor can this writer think of any. The finding that performance causes leader behavior, *almost* regardless of task structure condition, the second exception, indicates that instrumental leader behavior is relatively unimportant in terms of its effects on subordinate performance. Alternatively, it suggests that there are variables in addition to task structure—such as locus of control, ability relative to task demands, and other variables as suggested by House and Mitchell (1974) and Downey et al. (1976)—which need to be investigated as potential moderators of the ILB-subordinate performance relationship. At this point, task structure itself should not be disregarded as a potential moderator, since there were some indications, although statistically insignificant, that causation between these two variables was reciprocal in the low task structure condition.

The fact that significant findings were obtained in the relationships between ILB and both role clarity and satisfaction and between SLB and satisfaction, without consideration of either expectancy one or expectancy two, raises some questions about the importance of the expectancies. Indeed, perceived effort-performance probabilities (expectancy one) may well serve only as a measure of the efficiency of the leader's emphasis on instrumental behavior. Similarly, performance-reward probabilities (expectancy two) may be considered simply as a measure of the extent to which the leader is able to make rewards and punishments contingent on performance—a dimension of leadership not currently included in the theory. What one is left with are three dimensions of leader behavior, subordinate satisfaction and performance, and potential moderators, including task structure but excluding the expectancies. While this type of

speculation goes somewhat beyond the present research, it does offer a rather major modification of the theory which perhaps should be investigated.

Comparisons of the results obtained in both studies also emphasize problems, primarily the inability to make causal inferences, which are inherent in testing contingency theories by use of static correlational methods. Thus, one must conclude on the basis of this research that while the theory shows promise, it requires further refinement and testing by means of longitudinal studies or traditional experimental procedures—that is, by utilizing research designs which are capable of evaluating questions of causation.

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Some Correlations of Communication Roles in Organizations¹

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This paper is part of a large-scale research program concerned with organizational communication. The purpose here is to examine a set of variables possibly associated with the communication roles (isolate or participant) people occupy at work. The findings indicate that communication isolates and participants are differentiable in terms of affective and behavioral responses to work. Suggestions for future research are offered.

Recent papers (e.g., Connolly, 1977; Porter & Roberts, 1976; Roberts, O'Reilly, Bretton, & Porter, 1974) discuss the relative paucity of existing research relevant to organizational communication and the nature of investigations that might address some of the unanswered questions in this area. The purpose of this paper is to explore one of the avenues suggested. Clearly, theories relevant to communication in organizations cannot be developed until facets of organizational communication are specified and some of their correlates identified. Such mapping procedures have not been carried out. In fact, Porter & Roberts (1976) indicate that to the time of their review the bulk of our empirical knowledge about organizational communication rested on 22 field studies (p. 1579). This paper examines, then, relationships among sets of demographic and intrinsic characteristics of people and their communication role occupancy (isolation or participation) in three communication content defined networks (expertise, social, and formal authority). Role occupancy is then examined in relation to a set of responses thought to be important in terms of organizational viability.

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GROUPS AND ROLES

To understand the meaning of the concept of role, brief attention must be given to groups because roles cannot exist apart from groups. The term role implies that other persons act in a complementary or noncomplementary way to the focal role occupant and that group and network structures result from these interactions.

A number of definitions of groups exist. A group might be a collection of people bound together by a distinctive set of social relations (Broom & Selznick, 1968), a set of people who take each other into account and view themselves as having significant commonality (Olmstead, 1959), a collection of individuals who regularly communicate with one another (Homans, 1950), et cetera. Prerequisites of "groupness" within organizations may include recurring interaction, some degree of permanence, and a relatively small number of persons.

People can and do enact many roles in a single day and even in a single location. They enact them successively or simultaneously (e.g., see Linton, 1945). A number of role taxonomies have been proposed to bring some order to discussion of complex role systems. For example, roles might be specified by task assignment, power relations, liking, ascription, et cetera. One kind of taxonomy is a communication content based classification. That is, an individual's roles in his organization can be defined in terms of who he regularly talks to and about what sort of matters.

Almost every organizational writer discusses organizations in terms of formal authority and informal social information transmission systems. Some writers add to this a consideration of expertise systems. Authority interactions are characterized by information transmission concerned with the formal control aspects of organizations. Social interactions refer to nonjob relevant information transmission, while expertise communication is concerned with how to carry out the specific tasks of organizations. Two general assumptions are that these systems overlay one another in organizations and that individuals experience stress because of conflicting simultaneous demands of the several systems. A large number of studies deal with role conflict and ambiguity in organizations (Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964; Rizzo, House & Lirtzman, 1970; et cetera). Since this paper does not focus on conflict emanating from simultaneous role occupancy, that literature is not reviewed here. Until recently there existed no research specifically examining the extent to which expertise, social, and formal authority systems in fact simultaneously exist in real organizations. Nor was there any empirical evidence about the degree to which they overlap if they do exist. It is fruitless to discuss role occupancy within each of these frequently mentioned systems without first demonstrating empirically their existence.

Roberts and O'Reilly (1978) provide empirical evidence for the existence of expertise, social, and formal authority networks in three organizations, and demonstrate that these systems are relatively stable over time. They

also show that individuals may assume *participant* or *isolate* roles in these communication systems. Finally, these authors show that individuals frequently occupy the same roles in different communication content based systems. Participation and isolation (or communication versus noncommunication) are empirically defined in this work by assessing who does and does not talk to others in the organizations. Rogers and Agarwala-Rogers (1976) also discuss network differences (focusing on formal and informal differences) as does Miller (1975) who focuses on a broader set of network differences. Clearly, examination of participation and isolation should be made across content networks.

INDIVIDUAL CHARACTERISTICS AND COMMUNICATION ROLES

A considerable amount of research concerned with who communicates with whom and who does not communicate (for example, introversion-extroversion), who communicates about what kinds of content, et cetera, exists in personality and social psychology. Excellent reviews of the major bodies of this work are available in Bales (1957), Collins and Raven (1969), McGuire (1969), et cetera. Both Guetzkow (1965) and Porter and Roberts (1976) indicate that generalizing results of these studies to communication in organizations is dangerous. Most of these investigations were not conducted in organizations, situations in which total size, status and hierarchical differences, the necessity to complete work tasks, goals, differential job functions, systems of coordination, continuity through time, et cetera, may all simultaneously impinge on communication processes. Hence, there exists considerable suggestive evidence about individual characteristics relevant to communication role occupancy but little demonstration of external validity and no theoretical underpinnings from which to proceed.

From the interpersonal literature, two sets of research interests seem important in suggesting individual variables to examine in relation to communication role occupancy in complex organizations. First, a number of investigators find that people may communicate more with one another when they like each other (e.g., Lott & Lott, 1961). Liking, in part, seems based on perceptions of interpersonal similarity (e.g., Marlowe & Gergen, 1968; Rogers & Bhomik, 1971; Triandis, 1960), and some research shows that perceptions of interpersonal similarity reflect objective measures of similarity (e.g., Berscheid & Walster, 1969; Rogers, 1973). Thus, participants in communication networks should be describable by a larger number of similar characteristics than are isolates; perhaps they are more similar to one another than are isolates in a larger number of demographic characteristics or in more personality attributes.

Extrapolation of findings from some of the research concerned with motivation offers yet another set of individual characteristics that might be related profitably to communication role occupancy in organizations. The achievement motivation literature suggests that individuals high in the

need to achieve may not be as interested in social communication as low need achievers (McClelland, Atkinson, Clark, & Lowell, 1953). From Maslow's (1954) work on a need-based system of motivation comes the possibility that people who seek security and self-actualization may not be as high volume communicators as are those who seek social and ego gratification.

Two other lines of interpersonal research are somewhat helpful in suggesting the factors that may be related to communication role occupancy in organizations. One set of investigations is concerned with organizational grapevines and the other with innovation diffusion. Sutton and Porter (1968) in their grapevine investigation show no differences in personality characteristics between people who pass information and those who do not in the grapevine. This finding conflicts in some degree with the notion that people communicate with those who are similar to them and do not communicate with those who are dissimilar. However, both Sutton and Porter (1968) and Davis (1953) find that those people who know a piece of information are likely to be higher in the organizational hierarchy than are nonknowers, suggesting that communication may be more frequent among personnel in high than in low-status jobs. Other studies of management communication confirm the high communication activity of managers (Kelly, 1964; Wickesberg, 1968).

A number of research findings from the innovation diffusion literature concerned with characteristics of opinion leaders are consonant with the grapevine literature in suggesting characteristics of participants that might differentiate them from isolates. Rogers (1962; 1973) and Rogers and Shoemaker (1971) review this work. Rogers summarizes characteristics of communicators of innovations as having:

1) more formal education, 2) higher social status and wealth, 3) greater innovativeness in the adoption of new ideas. . . They are *accessible* to their followers, more *competent* . . . than their followers (1973, p. 298).

Although little of the innovation diffusion research has been done in organizations, a recent innovation diffusion study (Baldrige & Burnham, 1975) in organizations indicates that while administrative position and role appear to be important contributors to innovation, individual sex, age, and personal attitudes are not. Miller (1975) reports isolation from formal control to be associated with higher education, official authority, and sex. These somewhat conflicting conclusions point to the importance of examining simultaneously demographic and intrinsic characteristics related to participation (a probable precursor to innovation adoption) in organizational communication.

Taken together these findings suggest specific demographic and personality characteristics that might differentiate communicators and non-communicators in organizations. Generally, participants in organizational communication networks should be higher in rank or status, have more education, and have different personality or motivational characteristics

than isolates. There is no research that indicates whether one set of characteristics is more descriptive of communicators in a specific content defined communication system (for example, expertise versus social).

RESPONSES ASSOCIATED WITH COMMUNICATION ROLES

Most of what is known about the possible responses to or consequences of differential communication role occupancy in organizations comes from the communication network literature. This research is reviewed elsewhere [e.g., Collins & Raven (1969); Snadowsky (1972)]. Again, generalizing results from small group studies to complex organizations is of questionable value, a point demonstrated by Cohen, Robinson and Edwards (1969) in their investigation of the effects of embedding small groups in larger ones. The network studies do suggest some possible relationships of differential role occupancy and individual responses that should be examined in complex organizations.

The dependent variables investigated in the network studies of interest to us are those concerned with satisfaction and measures of information processing such as the speed and accuracy of information transmission. These measures might be thought of as possible indicators of performance. Generally, the more centralized one is in the network, the higher his satisfaction, and in all channel networks, participants are more satisfied than are peripherals in centralized networks. Centralized networks seem to be most effective when the problems to be solved are simple, and all channel networks are better for more complex problem solving, suggesting the possibility that communication participants perform better than do isolates in real organizations where problem complexity probably varies across time for any unit.

A series of investigations linking communication, information and performance (O'Reilly, 1977; O'Reilly & Roberts, 1977a; O'Reilly & Roberts, 1977b) suggest that the ability to obtain information is directly related to individual and group performance. This literature, as well as other evidence from studies of decision making (e.g., Connolly, 1977; Porat & Haas, 1969), suggests that isolation or participation that may affect information availability should be related to individual performance. Individuals who are relatively isolated in communication networks are expected to perform less well than communication participants who are more likely to have information available to guide actions.

Communication roles may also be related to an individual's affective responses at work. For example, Roberts and O'Reilly (1974) and Muchinsky (1977) report significant relationships among a number of communication dimensions and measures of job satisfaction, commitment and organizational climate. Other studies also linked communication isolation to structural alienation, showing that lack of communication activity is related to feelings of alienation (Hagedorn & Labovitz, 1968; Miller, 1975). These investigations suggest that relative isolation-participation in

communication networks should be related to one's affective responses at work.

In sum, while the available research suggests little about the effects of differential participation across social, expertise, or authority networks, there is evidence to support the existence of a positive relationship between communication and participation in organizations and communication and positive affect and performance.

HYPOTHESES

Intuitively, it is reasonable to expect different individual characteristics and responses to be associated with differential role occupancy across the various content-defined communication networks. For the purposes of this study, however, the *hypotheses* do not differentiate role occupancy across content of the communication networks because of the Roberts & O'Reilly (1978) findings of considerable role overlap across content-based networks. The data *analyses*, however, do examine separately the posited relationships for each of the content-based networks.

Two sets of exploratory hypotheses are presented; one group specifies relationships of potential demographic and personality characteristics to role occupancy, the other is concerned with possible responses to role occupancy (perceived communication behavior, satisfaction, commitment, and performance). The general notion explored is that there exist significant demographic and personality differences between isolates and participants in organizational communication networks. Further, there are also significant differences between role occupants in their perceptions about communication, their affective responses to work, and their performance. It is felt that participation in communication activities has a positive effect on organizationally relevant outcomes, while isolation has a negative effect.

More specific hypotheses are:

Individual Characteristics

Hypothesis 1—Participants are higher in rank than are isolates.

Hypothesis 2—Participants have more education than do isolates.

Hypothesis 3—Participants have higher tenure in the specific organization (the squadron) and in the Navy than do isolates.

Hypothesis 4—Participants have higher needs for achievement than do isolates.

Hypothesis 5—Participants have higher needs for power than do isolates.

Hypothesis 6—Isolates have higher needs for self-actualization than do participants.

Responses

Hypothesis 7—Participants are higher in job satisfaction than are isolates.

Hypothesis 8—Participants are better performers than are isolates.

Hypothesis 9—Participants are more committed to their organizations than are isolates.

Hypothesis 10—Participants and isolates perceive various aspects of communication in their organizations differently.

METHOD

Subjects

The respondents were 579 officers and enlisted personnel in three high technology military organizations. Personnel were assessed three months after their units were organized. The response rate was 81 percent of the total available sample.

Procedure

Respondents were asked to complete a survey instrument containing demographic questions, a series of questions concerned with their perceptions and feelings about various aspects of their work environments, and three sociometric questions. The raw data used to define one's communication role in his expertise, social, and formal authority networks were answers to the following three questions:

1. When you need *technical advice* in doing your job, who are the persons you are most likely to ask? (*expertise*)
2. With which persons in this squadron are you most likely to have *social conversations* (not work-related) in the course of a work day? (*social*)
3. If you are upset about something related to the Navy or to your job, to whom in the squadron are you most likely to express your dissatisfaction (gripe) *formally*? (*authority*)

The large-scale sociometric technique through which the raw data were transformed into role specifications (isolate or participant) for individuals in each network is discussed in Richards (1974a; 1974b; 1974c) and in Roberts and O'Reilly (1978). Particular attention is paid to the advantages in this kind of research of using this compared to other available techniques.

Richards' network analysis is accomplished by a two-stage process. First, social choices of each individual are used to construct vectors with the direction set by identification of the other contacted and the magnitude indicated by the strength of the relationship (frequency and importance rating) for that link. Thus, each individual (a node) is linked to other nodes. A tentative solution to the network structure is achieved by constructing a vector with all nodes using heuristically a topological pattern recognition technique to group together those nodes with similar ties. The process is analogous to rearranged nodes connected by rubberbands

to allow those nodes connected more tightly to group together (Richards, 1974b). Once the tentative group structure, a clustering of nodes along a vector, is achieved, an exact solution is obtained by applying various criteria to the nodes. As part of the analysis, individual nodes are tested to see if they meet the following role criteria:

1. *Nonparticipants* are either not connected or only minimally connected to the rest of the network, that is, are nodes with either none or only a single link to a "participant."
2. *Participants* have two or more links to other participants.

Participants can be further differentiated into group members (having 50 percent of their linkages to a set of three or more other nodes), liaisons (who have less than 50 percent of their linkages within a single group but who are linked to several groups), and others (who fail to have 50 percent of their links with any set of group members but who are tied to more than one other participant). For the purposes of this investigation, participation/nonparticipation in organizational communication was the most basic and important distinction to make and because in other analyses further differentiation of this group was not particularly revealing.

A number of techniques can be used to assess communication in organizations. These range from intensive direct observations, to the use of communication logs, to questionnaires, to a number of sociometric methods. While each method has particular measurement problems (e.g., Roberts & O'Reilly, 1977), sociometric techniques allow for the unambiguous identification of communication roles. Several studies have compared different sociometric approaches (e.g., Lankford, 1974; Nosanchuk, 1963). Only the program developed by Richards (1974a, b, c), however, can be used economically with large numbers of respondents. Reliability and validity information for this technique is contained in Richards (1974a, b, c). Results suggest that this technique is less sensitive to missing data than other sociometric programs that utilize matrix manipulation routines.

The demographic variables assessed were rank and tenure in the organization, population size of community in which the respondent was raised, amount of education, age, and tenure in the Navy. Assessment of job-related intrinsic characteristics was obtained from the Self Description Inventory, a measure shown to be highly work-related. Ghiselli (1971) provides reliability and validity data and groups his 13 scales into three dimensions (1) abilities (supervisory, intelligence, initiative); (2) personality (self-assurance, decisiveness, masculinity-femininity, work class affinity); and (3) motivation (needs for occupational status, self-actualization, power over others, high financial rewards, and job security).

The four sets of responses or possible consequences of communication role occupancy were assessed using the following instruments. The Job Descriptive Index (Smith, Kendall & Hulin, 1969) was used to assess five facets of job satisfaction: satisfaction with work, co-workers, pay, super-

vision, and promotional opportunities. Kunin's (1955) GM Faces Scale measured overall job satisfaction. Seventeen aspects of communication perceptions were measured using an extension of the questionnaire described in Roberts and O'Reilly (1974). Organizational commitment was measured using an instrument developed by Porter and Smith (1970). This instrument provides an overall index of the degree to which one is committed to his organization. Performance assessments were obtained from annual supervisory ratings. Comparable evaluations were available from a sample of 405 enlisted personnel for five aspects of performance: leadership, military appearance, professional performance, military behavior, and adaptability. However, a factor analysis of the ratings revealed only one dimension. Thus, overall ratings for each of the 405 respondents were used.

ANALYSES

Discriminant function analyses were used to differentiate isolates and participants across the three substantive networks (expertise, social, and formal authority) for demographic and intrinsic characteristics and for response variables (satisfaction and perceived communication). A total of six discriminant function analyses were computed. In addition *t*-tests were used to examine role occupancy differences in organizational commitment and individual performance.

RESULTS AND DISCUSSION

Table 1 presents the discriminant function weights and group centroids for the six demographic variables. Tatsuoka (1970, p. 3) suggests interpreting those weights whose absolute values are no less than one-half of the absolute value of the largest weight.

TABLE 1
Discriminant Function Coefficients for Isolate-Participant Groups:
Demographic Variables Across Three Communication Networks

Variable	Network		
	Authority	Social	Expertise
1. Rank	.45	-.22	.28
2. Tenure-Organization	-.03	-.07	.07
3. Community Population	-.06	-.15	.03
4. Education	-.21	-.23	-.09
5. Age	.12	.15	-.02
6. Tenure-Navy	-.27	-.15	.05
Significance	.01	.001	.001
Variance Explained	.05	.08	.07
<i>Group Centroids</i>			
Isolates	.20	.70	-.80
Participants	-.26	-.11	.09

Significant discriminant functions are shown for each of the three networks. First, discriminant weights for the authority network suggest that higher rank is positively associated with the isolate role, while participants are distinguished by lower education and tenure in the Navy. This may reflect the tendency for people in high ranking authority positions to have little opportunity for interaction, while lower ranking, less tenured members participate in formal authority groups. Interpretation of weights for the social network discriminant function suggests higher rank, higher education, longer tenure in the Navy, and larger size of community in which the respondent was raised are descriptors of participants, while isolates are characterized by younger age. The expertise network discriminant function shows that higher rank delineates participants from isolates.

A general conclusion is that familiarity with the Navy, but not necessarily with the particular organization within the Navy, is positively associated with participation in social and expertise networks. Hypotheses 1 and 2 are supported. Hypothesis 3, postulating increased tenure for participants, is partially supported; participants have higher tenure in the Navy but interestingly not in the specific organization. The three-month interval from the birth of the organizations to assessment of their personnel simply may have been too short to assess the relationship between organizational tenure and communication role occupancy.

Discriminant function weights for the relationship of personality characteristics to communication role occupancy across the three networks are shown in Table 2. Only the discriminant function for the authority network is statistically significant at the $p < .01$ level.

TABLE 2
Discriminant Function Coefficients for Isolate-Participant Groups:
Personality Variables Across Three Communication Networks

Variable	Network		
	Authority	Social	Expertise
1. Supervisory Ability	.02	.02	.01
2. Intelligence	.04	-.04	-.06
3. Initiative	-.09	.05	.04
4. Self-Assurance	.03	-.06	.04
5. Decisiveness	.12	.12	-.08
6. Masculine-Feminine	.23	-.06	-.12
7. Maturity	.13	-.03	-.14
8. Working Class Affinity	-.03	.08	-.05
9. Need for Achievement	.08	.00	-.05
10. Need for Self-Actualization	.00	.17	-.09
11. Need for Power	-.09	-.16	-.06
12. Need for Financial Reward	.00	-.08	-.14
13. Need for Security	-.15	.11	.04
Significance	.01	.14	.07
Variance Explained	.08	.05	.06
<i>Group Centroids</i>			
Isolates	-.24	.55	.72
Participants	.31	-.08	-.08

Again, noting the group centroid values, participants in the authority network are more decisive, masculine, and mature. Isolates have a high need for security. While only marginally significant ($p < .07$), the discriminant function weights for the expertise network reveal a similar personality cluster for participants plus needs for financial reward and self-actualization. Participants appear to have a stronger concept of self (e.g., they are more mature and decisive) than do isolates.

The general hypotheses that there are personality differences between isolates and participants appears tenable. However, specific hypotheses received little support. Only hypothesis 6 received some support. Generally, though, participants are describable by a number of intrinsic characteristics, suggesting they are somewhat homogeneous, as posited.

Tables 3 and 4 present discriminant function weights for the isolate-participant groups for response variables. Table 3 shows the weights for the 17 perceived communication variables.

TABLE 3
Discriminant Function Coefficients for Isolate-Participant Groups:
Perceived Communication Variables Across Three Communication Networks

Variable	Network		
	Authority	Social	Expertise
1. Communication Content-Upward	.07	-.13	-.03
2. Communication Content-Downward	.10	-.22	-.07
3. Communication Content-Lateral	.05	-.17	.00
4. Perceived Accuracy	.00	-.02	-.03
5. Desire for Interaction	-.15	-.05	-.03
6. Summarize Information	.06	-.12	-.08
7. Amount of Information Passed	-.05	.02	-.01
8. Deliberately Change Information	.06	.00	.06
9. Expand Information	.01	-.06	-.05
10. Modality Use-Written	-.20	.18	-.19
11. Modality Face-to-Face	-.10	.08	-.13
12. Modality Telephone	-.24	.23	-.17
13. Receive <i>Too Much</i> Information	.00	-.05	.00
14. Receive <i>Too Little</i> Information	-.13	.02	-.05
15. Receive <i>Redundant</i> Information	-.02	-.18	-.10
16. Deliberately Withhold Information	.00	-.04	.16
17. Satisfaction with Communication	.20	.07	.11
Significance	.17	.001	.05
Variance Explained	.06	.11	.07
<i>Group Centroids</i>			
Isolates	-.21	.83	.79
Participants	.27	-.13	-.09

The discriminant functions for the social and expertise networks are significant. The expertise network results show participants perceive that various communication modalities are used and that they receive redundant information. Isolates are described by an increased tendency to deliberately withhold information and lower satisfaction with communication in general.

In the social network, participants are different from isolates in their perceptions about the directionality of communication contacts, the perception of receiving redundant information, and a tendency to summarize to insure transmission of important information. Isolates perceive more use of written and telephone means of information exchange than do participants.

A general conclusion is that being a communication isolate is associated with increased use of telephone and written communication and a tendency to deliberately withhold information from others. Participation in communications is associated with perceptions of increased information flow of communication, more redundancy, and greater overall satisfaction with communication. Hypothesis 10 concerned with differences in perceptions of communications between participants and isolates is confirmed.

Discriminant function weights for the six job satisfaction variables show overall satisfaction as the major factor differentiating communication role occupants in both the authority and social networks. No other weight was large enough to be interpreted. Hypothesis 7 is generally supported.

TABLE 4
Discriminant Function Coefficients for Isolate-Participant Groups:
Job Satisfaction Variables Across Three Communication Networks

Variable	Network		
	Authority	Social	Expertise
1. WJDI	.08	.03	.03
2. PRJDI	-.01	-.03	-.12
3. PAJDI	.05	.02	.03
4. SUJDI	-.02	-.04	-.05
5. COJDI	-.03	-.06	-.06
6. GM FACES	-.73	-.32	.03
Significance	.06	.04	.10
Variance Explained	.04	.04	.03
<i>Group Centroids</i>			
Isolates	.17	.48	.51
Participants	-.21	-.07	-.06

Finally, differences in organizational commitment and performance associated with communication role occupancy are shown in Table 5. There were no significant differences in commitment between isolates and participants for the social and authority networks. However, participants in the expertise network are significantly more committed to the Navy ($p < .05$), suggesting the importance of determining whether participation acts to increase organizational commitment or commitment leads to participation. Hypothesis 9 is weakly supported.

Differences in role occupancy and performance are clear. Participation in communication networks is associated with higher performance than is isolation. This difference is most striking for the expertise networks. These

TABLE 5
T-tests for Commitment and Performance
Across Three Communication Networks

Variable	Authority			Social			Expertise		
	Isolate <i>X</i>	Participant <i>X</i>	Significance	Isolate <i>X</i>	Participant <i>X</i>	Significance	Isolate <i>X</i>	Participant <i>X</i>	Significance
Commitment to the Navy	69.2	69.9	NS	69.1	69.4	NS	69.7	74.6	.04
Performance	148.3	150.1	.08	147.3	149.5	.07	146.7	148.2	.03

results suggest again the need to ascertain the causal relationships between performance and communication in organizations. Hypothesis 8 is clearly confirmed.

The general hypotheses underlying this study appear to be corroborated. Differential role occupancy is reflected in significant differences in both individual characteristics and responses. Participation in communication is generally associated with positive responses.

DISCUSSION

While causal inferences cannot be drawn from these data, there are a number of interesting findings. First, an overview suggests that it is possible to differentiate individuals who occupy different communication roles on the basis of sets of intrinsic and response variables. Further, some differences in communication role occupancy are similar across content-based networks.

Participants in communication networks are also different from isolates in their reported communication perceptions. Isolates express greater tendency to use written and telephone modalities in social networks, suggesting they may have communication links *outside* the organization, since they are characterized by less internal organizational communication than participants. Participants report greater communication activity (directionality) and information redundancy inside the organization. Isolates in the expertise networks report a greater tendency to deliberately withhold information and lower satisfaction with communication in general. Overall the picture is one of dysfunctional aspects for individuals who are not integrated into organizational communication networks.

This point is underscored when observing differences in satisfaction, commitment, and performance between occupants of different communication roles. Participants are generally more satisfied with their jobs, more committed to their organizations, and higher performers. Alternatively, communication isolation is associated with negative affective and performance characteristics.

The amount of variance explained in the association with communication role occupancy of either the individual characteristics or response

variable sets is relatively small. However, the results are internally consistent. Given the exploratory nature of this investigation, they seem promising. They suggest that one's participation in communication activities is associated in a nonrandom manner with important organizational outcomes. In light of the fact that participation/isolation differentiation is the first and most unrefined cut one can make into communication networks, data seem particularly supportive of the notion that communication is an important component of individual attitudes and behavior.

Additional research should focus on causal relationships between participation in communication networks and role determinants and outcomes. It should focus on a more differentiated set of communication roles. It should also be done in organizations with different missions and in which the relationship of different structure technologies, et cetera, to communication can be examined. The results here may only be generalizable to other high technology organizations in which jobs are arranged to reduce the possibility of costly errors.

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Influence of Organization Structure on Role Conflict and Ambiguity for Three Occupational Groupings¹

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The impact of organization structure on perceptions of role conflict and ambiguity was examined within a multivariate framework and found to explain substantial portions of variation in both role perceptions. These structural influences were generally supported across three occupational groupings: professional employees (n=55); secretarial/clerical employees (n=127); and blue-collar employees (n=70) within one public organization. Minor differences were noted between occupational groupings with respect to which structural properties were more influential in determining role perceptions.

Contemporary writers have indicated a growing willingness to regard role conflict and role ambiguity as critical variables in evolving models of organizational behavior (e.g., House & Rizzo, 1972; Miles & Perreault, 1976). While many questions remain concerning the manner in which these two role perceptions should be incorporated into such models, extensive empirical work has generally shown role conflict and ambiguity to be adversely related to a variety of attitudinal, psychosomatic and behavioral outcomes (e.g., Brief & Aldag, 1976; Hamner & Tosi, 1974; Lyons, 1971; Miles, 1975, 1976; Rizzo, House & Lirtzman, 1970; Schuler, 1975; Tosi, 1971).

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To date, however, far less empirical work has been directed toward examining *antecedents* of role conflict and ambiguity. This is especially true with regard to identifying the influences on role conflict and ambiguity of structural dimensions of the work settings in which organizational roles are enacted. Although the necessity for multivariate designs and their attendant statistical difficulties have probably tended to inhibit empirical work in this area, the relative scarcity of information remains disturbing in view of the importance ascribed to organizational factors in theoretical models of role determination (Kahn, Wolfe, Quinn, Snoek & Rosenthal, 1964). An additional impetus for research in this area stems from its potential value to managers. Although the unfavorable effects of role conflict and ambiguity have been widely reported, corrective action will be hampered until more is known about their respective sources. Properties of work settings constitute an especially practical focus for managers in this regard because they can exert some discretion over this particular dimension of role determinants.

Hence, the present study addressed two issues related to organizationally-anchored determinants of role conflict and role ambiguity. First, how well would a common set of structural properties predict levels of role conflict and role ambiguity? Second, to what extent would such predictions be sensitive to differences in the occupational characteristics of the roles examined? The importance of the first question is suggested by the lack of multivariate studies in this area relative to the theoretical support for postulating relationships between organizational factors and perceptions of work roles. The use of structural properties as a means of conveying formal, role-relevant expectations is, implicitly at least, among the most ubiquitous and enduring prescriptions to be inferred from organizational theory (see for example, Katz & Kahn, 1966; Taylor, 1911; Weber, 1947). Moreover, objective contextual properties are thought to be of importance as role determinants because they must constrain potentially wide variations in personal and interpersonal factors which are, in themselves, partial determinants of the way in which organizational roles are perceived (Kahn et al., 1964).

However, it is still not clear whether the simultaneous impact of certain objectively distinct (but probably interactive) structural properties is differentially effective in explaining variations in role conflict versus role ambiguity. Recent studies which have come closest to confronting this issue have limitations which do not allow this question to be examined directly. For example, a study by House and Rizzo (1972) made an important contribution by identifying several characteristics of organizations which were related to role conflict and/or role ambiguity; however, the bivariate analytic techniques used in the study did not allow for an assessment of the impact of sets of characteristics on the two role perceptions. Although Rogers and Molnar (1976) overcame this design limitation with their multivariate approach, the contextual properties included in their study were, for the most part, specific to the high-level, boundary-spanning

roles they examined. In addition, the absolute number of predictor variables used in their regression solutions (relative to their sample size) may have left the proportions of variation explained in role conflict and role ambiguity open to question.

Analytically, the second research question addressed in this study consisted of two dimensions. The first of these concerned an assessment of the extent to which the addition of occupational differences information would make a significant contribution to explained variation in each of the two role perceptions beyond that explained by the set of structural properties alone. An additional dimension of the question concerned whether separate multivariate predictive models based on separate occupational groupings would significantly improve the variation explained in each role perception over that obtainable from a common (aggregate) regression solution in which occupational differences were represented by dummy variables.

The rationale for examining occupational differences is derived from a controversy about whether responses to role conflict and/or role ambiguity differ depending on the nature of the role under consideration. For example, Hamner and Tosi (1974) and Schuler (1975) have advanced the argument (and data in support of it) that responses to role conflict and role ambiguity may be dependent upon occupational and/or positional differences among role incumbants. However, Miles (1976) was unable to support this argument and suggested that additional studies which include low-level as well as high-level occupations would be necessary to rigorously assess this proposition. Although the present study does not examine differential responses to role conflict and ambiguity, it does have implications concerning *organizational* strategies for coping with these issues in substantially different occupational groupings.

METHOD

Sample and Research Setting

Data for this study were collected from a sample of nonacademic employees of a major university. In order to facilitate between-group comparisons and to provide a representative sample, a content analysis was made of the formally prescribed activities inherent in each of the nonacademic job classifications existing in the organization. From this analysis, three primary occupational groupings were defined and used as strata for data collection (for a discussion of a similar procedure, see Adams, Laker & Hulin, 1977). The *professional* grouping ($n=55$) included such jobs as computer analyst, accountant, and other professionals occupying nonexternal boundary positions in various service divisions of the organization. *Secretarial/clerical* employees comprised the second grouping, and these jobs included secretaries, administrative assistants, and library clerks ($n=127$). The third category, blue-collar employees

($n = 70$), consisted of such jobs as building and grounds maintenance, dormitory maids, and food handlers. Supervisory as well as nonsupervisory positions were represented in each job grouping. In addition, each grouping was defined so as to include entry level as well as advanced positions, although in the secretarial/clerical and blue-collar groupings "career ladder" spans were predictably small.

Research Instruments

Role conflict and role ambiguity were measured with scales developed by Rizzo, House, and Lirtzman (1970). The selection of these scales was based on previous evidence of their factorial independence and their extensive use in other studies. For the present study, the two role perceptions were related at $r = .47$; coefficient alpha (Cronbach, 1951) estimates of internal reliability were .82 for role conflict and .78 for role ambiguity.

The structural factors selected as predictor variables in this study were a particularly important concern for several reasons. First, previous multivariate studies in this topic area have been limited to samples drawn from high-level occupational groups and many of the organizationally-anchored properties measured in those studies were relevant only to such high-level, boundary-spanning positions (see Miles & Perreault, 1976; Rogers & Molnar, 1976). Thus, an important consideration for the present study was the selection and measurement of structural factors which typically transcend (in degree at least) occupational/positional differences. Second, the structural factors needed to have at least an a priori linkage with perceptions of the work role. Thus, each factor included here was partly selected on the basis of its empirical or theoretical relevance to the concept of work roles. Finally, for purposes of multivariate model building, care was taken to identify factors which were thought to be conceptually and operationally distinct components of organization structure. It was hoped that following this latter criterion would provide a relatively encompassing and nonoverlapping representation of structural influences on the work contexts represented in the sample. In addition, it was expected that such a selection criterion would serve to reduce the intercorrelation (and thus, multicollinearity) of predictors in the regression solutions.

In consideration of their relatively objective nature, the following factors were measured with single-item scales (with the exception of participation in decision making): *Work group size*—this characteristic represented the number of different co-workers with whom the respondent typically worked directly in carrying out job assignments. Respondents checked a prearranged numerical category with five possible choices ranging from "0" to "more than 16 persons." *Span of subordination*—this variable constituted the extent to which the respondent was exposed to multiple authority with regard to the initiation of his or her work assignments. The item asked respondents to select one of five categories, ranging from "1"



to "5" persons, which best indicated the number of different individuals who typically assigned work to the respondents. *Supervisory span*—for this measure, the respondent checked a category representing the number of subordinates for whom he or she was charged with direct, formal responsibility. The five categories ranged from "no persons" to "more than 16 persons."

The following variables were measured using Likert-type response formats indicating the respondent's extent of agreement or disagreement with the related statement. *Functional dependence*—measured the extent to which the respondent was directly dependent upon the work of others to complete his or her own task assignments. *Formalization*—tapped the extent to which written rules and procedures were available regarding the respondent's job. *Participation in decision making*—adapted from Vroom (1960), this objectively-anchored six-item scale measured a respondent's perceived level of job-related discretion. Although participation has been conceptualized as both a personal variable (e.g., Graen, Dansereau & Minami, 1972) and a structurally-based variable (e.g., Hage & Aiken, 1967; Tannenbaum, 1968), it was treated as a structural variable in the present analysis because the sampling procedure included multiple organizational units. Coefficient alpha was .85 for this study.

Additional measures included demographic characteristics concerning the respondent's age, sex, education, and tenure on the job. These items were used to check for spurious relationships before regression analyses were conducted.

Data Collection

A frame representing all of the organization's nonacademic, full-time staff was obtained ($n = 608$). Based upon the analysis described earlier, individual job classifications from this frame were aggregated into three occupational groupings (professional, $n = 133$; secretarial/clerical, $n = 305$; and blue-collar, $n = 170$), each of which was to serve as a stratum from which a 75 percent random sample was selected. The random sample was drawn by consecutively numbering each employee (within each grouping) and then selecting members with the aid of a random number table until 75 percent of each grouping had been represented. Employees selected by this procedure were subsequently sent questionnaires via campus mail (professional, $n = 99$; secretarial/clerical, $n = 229$; blue-collar, $n = 127$; total mailing, $n = 455$). All respondents were informed via cover letter that participation was voluntary and that individual responses would be treated with strict confidentiality.

Due to transfers, terminations, and other status changes not reflected in records at the time of mailing, 46 questionnaires were returned unopened (professional, nine; secretarial/clerical, 23; blue-collar, 14); for an adjusted $n = 409$. Two-hundred and eighty-three questionnaires were returned by respondents (professional, $n = 64$; secretarial/clerical, $n = 150$;

blue-collar, $n = 84$). Of these returns, 252 questionnaires had no missing responses and were used in the present study in the numbers described earlier. Overall, then, the net aggregate response rate, based on the adjusted n (409) and fully completed questionnaire returns ($n = 252$), was 62 percent. For individual occupational groupings, the net response rates were: professional, 61 percent; secretarial/clerical, 62 percent; and blue-collar, 62 percent, based on adjusted n 's of 90, 206, and 113, and completely usable responses of 55, 127, and 70, respectively. This response rate represented approximately 41 percent of the organization's entire full-time, nonacademic staff.

Data Analysis

Initial concern focused on possible spurious effects that could interfere with tests of the main research questions. Therefore, an examination was made of intercorrelations between the several structural variables, since high levels of intercorrelation would complicate interpretations of regression models. The average intercorrelation between structural variables was .08, ranging from .00 to .24 in magnitude.

Subgroup demographic characteristics were also examined. These variables are shown in Table 1, along with descriptive characteristics of other study variables. From Table 1 it can be noted that the secretarial/clerical group tended to be somewhat younger and less tenured than members of the other two groupings; however, these characteristics accounted for little variance in the role perceptions to be used as dependent variables in the regression models. Further, the relationships between education and role perceptions are an apparent artifact of the influence of

TABLE 1
Descriptive Statistics for Demographic and Study Variables
and Correlations with Role Perceptions

Variable	Blue-Collar		Secretarial/ Clerical		Professional		Pearson Correlations ($n = 252$)	
	\bar{X}	<i>sd</i>	\bar{X}	<i>sd</i>	\bar{X}	<i>sd</i>	Role Conflict	Role Ambiguity
Age ^a	44.46	12.85	35.03	11.86	40.34	11.80	-.10	-.17**
Education ^a	11.90	1.93	13.87	2.01	16.00	1.72	.13*	.18**
Job tenure ^a	10.31	8.60	7.02	7.19	10.89	8.39	.07	-.09
Formalization	4.42	2.00	4.10	2.05	3.44	2.12	-.17**	-.23**
Supervisory span	3.03	3.09	2.62	2.65	5.24	3.75	.16**	-.03
Work group size	3.85	4.00	2.35	3.00	2.02	2.82	.16**	-.07
Span of subordination	2.47	1.36	3.73	1.46	3.21	1.86	.17**	.18**
Functional interdependence	4.87	1.58	4.52	1.70	4.45	2.03	.03	-.06
Participation	3.08	0.89	3.42	0.90	3.93	0.83	-.27**	-.36**
Role conflict	3.01	1.36	3.50	1.43	3.88	1.37	—	.47**
Role ambiguity	2.80	1.36	3.02	1.29	3.24	1.40	—	—

^aIn years

* $p < .05$

** $p < .01$

occupational grouping on role perceptions in that the more highly educated professionals experienced greater levels of role conflict and ambiguity. Finally, sufficient and comparable variance in role perceptions existed within each occupational grouping to preclude restriction of range concerns which may otherwise have compromised the comparisons to be made subsequently between regression models based on separate occupational groupings.

Multiple regression was the primary statistical procedure used in the study. All regression solutions were generated by the step-wise multiple regression algorithm from the *Statistical Package for the Social Sciences* (Nie, Bent & Hull, 1970). By employing regression analyses it was possible to examine the influences of the structural properties *as a set*, thereby overcoming a constraint in bivariate correlational approaches to the issues at hand.

RESULTS

Structure, Role Conflict, and Role Ambiguity

The first research question was addressed by regressing, respectively, role conflict and role ambiguity on the set of predictor variables using data from the entire sample ($n=252$). Results of this first level of analysis (before occupational groupings were considered) are shown in Table 2.

TABLE 2
Regression of Role Conflict and Role Ambiguity on
Structural Characteristics ($n = 252$)

Independent Variable	Role Conflict		Role Ambiguity	
	Beta	Partial F-Ratio	Beta	Partial F-Ratio
Participation in decision making	-.364	38.39*	-.428	53.93*
Supervisory span	.279	21.61*	.112	3.76
Span of subordination	.229	16.46*	.243	18.84*
Formalization	-.194	12.07*	-.211	14.27*
Work group size	.086	2.38	-.074	1.70
Functional dependence	.003	0.00	-.031	0.30
	$R = .48$; $df = 6, 245$; $F = 15.06$; $p < .001$		$R = .50$; $df = 6, 245$; $F = 13.77$; $p < .001$	

* $p < .001$

Comparing the regressions in Table 2 indicates that the proportion of variance explained by the set of predictors was virtually identical for role conflict and ambiguity ($R^2 = .23$ for role conflict and .25 for role ambiguity). Given the limited array of structural factors represented and the fact that personal and interpersonal dimensions of role determination were omitted from the study, a surprisingly large portion of variance was explained. The F -ratios reported in the tables are partial F -ratios; as such,

they represent the significance of the amount of variance contributed by a given predictor variable when all other variables were included in the model. Participation in decision making, supervisory span, span of subordination, and formalization each made a highly significant contribution ($p \leq .001$) to explained variance in role conflict. Participation in decision making, span of subordination, and formalization repeated as highly significant predictors ($p \leq .001$) of role ambiguity, but supervisory span did not retain its significance in this equation. Work group size and functional dependence did not enter either equation at a significant level.

Addressing the second research question involved adding occupational grouping data to the set of structural properties and then generating regression solutions for role conflict and ambiguity, respectively. For role conflict the addition of dummy variables representing occupational groupings yielded an increase of 5 percent in explained variation ($R^2 = .28$) beyond that derived from the regression solution represented in Table 2. An F test of the improvement in R^2 was significant at the .05 level ($F = 3.97$, $df = 1, 242$). For role ambiguity, the same procedure resulted in an R^2 increase of 2 percent ($R^2 = .27$). This increase in R^2 was weakly significant ($F = 2.81$, $df = 1, 242$, $p \leq .10$). These R^2 increases appear to be associated with higher levels of role conflict and ambiguity which obtained among the white-collar, especially professional, employees (see Table 1).

Occupational Differences

The above findings, then, suggested that information was lost when occupational differences were ignored in constructing regression solutions for role conflict and role ambiguity. However, they did not indicate whether a common (aggregated data) regression solution for each role perception might have obscured differences extant *between* occupational groupings with regard to functional interrelationships among the structural characteristics used as predictor variables. To investigate this question, regression equations for each role perception were generated for separate occupational groupings. (These results are shown in Tables 3 and 4 and will be discussed below). Subsequently, for each of the two role perceptions, the related *set* of three by-group equations was compared with the common solution (described above). To test for differences between the common solutions and the sets of by-group solutions, Chow's (1960) test for equality of regression was applied. Essentially, the Chow procedure yields an F statistic based on a comparison of the residual sums of squares between regression equations. Thus, in the present applications the *total* residual sums of squares of the set of by-group solutions was compared with the residual sum of squares obtained from the common solution for role conflict and role ambiguity, respectively.

The result for role conflict was an $F = 1.75$ with $df = 12, 238$, which was not significant at the .05 level. For role ambiguity, however, the

procedure yielded an observed $F = 2.06$ with $df = 12, 238$, which was significant at $p \leq .05$. In the case of role conflict, this result indicated that the slopes of the separate (by-group) regression lines were essentially equal. From an interpretive standpoint, this means that apart from group differences in *levels* of role conflict (reflected in the intercept term of regression solutions), the common regression solution for role conflict was generalizable across occupational groupings. In contrast, this analysis suggested an interaction between occupational groupings and the functional relationships among this set of structural properties vis-à-vis role *ambiguity*. In this latter case, not only did differences between groups exist in

TABLE 3
Regression of Role Conflict on Structural Characteristics
by Occupational Groupings^a

Independent Variable	Blue-Collar		Secretarial/Clerical		Professional	
	Beta	Partial F-Ratio	Beta	Partial F-Ratio	Beta	Partial F-Ratio
Participation in decision making	-.586	27.36**	-.389	22.47**	-.513	13.45**
Supervisory span	.216	3.96	.288	11.90**	.130	.90
Span of subordination	.109	1.09	.198	6.10*	.137	.97
Formalization	-.052	.23	-.176	4.52*	-.126	.85
Work group size	.093	.81	.136	2.72	.122	.79
Functional dependence	.001	.00	.070	.73	.010	.02
	$R = .59$; $R^2 = .30$		$R = .51$; $R^2 = .23$		$R = .56$; $R^2 = .22$	
	$df = 6, 63$; $F = 6.73$		$df = 6, 120$; $F = 7.07$		$df = 6, 48$; $F = 3.41$	
	$p < .001$		$p < .001$		$p < .01$	

^aN, are, respectively, 70, 127, and 55 for the three occupational groupings.

* $p < .05$

** $p < .01$

TABLE 4
Regression of Role Ambiguity on Structural Characteristics
by Occupational Groupings^a

Independent Variable	Blue-Collar		Secretarial/Clerical		Professional	
	Beta	Partial F-Ratio	Beta	Partial F-Ratio	Beta	Partial F-Ratio
Participation in decision making	-.433	12.30**	-.485	36.45**	-.515	15.52**
Supervisory span	.175	.38	.146	3.20	-.156	1.46
Span of subordination	.207	3.20	.185	5.55*	.301	5.31*
Formalization	-.075	.40	-.216	7.14**	-.220	2.96
Work group size	-.172	2.14	-.046	.32	.044	.12
Functional dependence	.033	.08	-.022	.07	-.048	.13
	$R = .47$; $R^2 = .15$		$R = .51$; $R^2 = .26$		$R = .65$; $R^2 = .33$	
	$df = 6, 63$; $F = 2.98$		$df = 6, 120$; $F = 8.29$		$df = 6, 48$; $F = 4.56$	
	$p < .05$		$p < .001$		$p < .01$	

^aN, are, respectively, 70, 127, and 55 for the three occupational groupings.

* $p < .05$

** $p < .01$

levels of role ambiguity, but the patterns of relationships between structural properties and role ambiguity were different among these occupational groupings. Note from Table 4 that without a specific test for the equality of regression, an inspection of the apparently similar betas alone would probably not have suggested this across-grouping difference.

Tables 3 and 4 display the results from the by-group equations described above. Because the ratios of predictor variables to the number of observations were diminished in the by-group analyses, the coefficients of determination (R^2) reported in the tables are corrected for shrinkage (R^2_s) to provide a more conservative estimate of explained variation than would the uncorrected R^2 . Table 3 indicates that the variation explained in role conflict by this set of structural properties was highly significant for all occupational categories, ranging from a low of 22 percent for the professional grouping to a high of 30 percent for the blue-collar grouping. Levels of explained variation in role ambiguity (Table 4) were also significant across all groupings, ranging from a low of 15 percent for the blue-collar grouping to a high of 33 percent for the professional grouping. Participation in decision making appeared to be an especially salient determinant of role conflict as well as role ambiguity across all occupational groupings.

Caution is in order here against attempting definitive interpretations of these results. Differences in sample size between groupings and the lack of complete statistical independence between predictor variables suggest a conservative treatment in this regard. In addition, the interrelationships among the predictor variables themselves as well as their simultaneous linkages with role conflict and ambiguity are not yet completely understood. As a consequence of these limitations, the underlying notion of causality implied between these structurally-based factors and role conflict and ambiguity should be held as tentative and in want of future research targeted directly at this issue.

DISCUSSION

This study sought to examine the effects of structural properties on perceptions of role conflict and ambiguity and to determine whether occupational grouping influenced this relationship. In so doing, it was hoped to extend earlier work on role processes as it relates to organizational behavior.

Several important findings emerged. First, before considering occupational differences, *role conflict* was found to be significantly related to participation in decision making, supervisory span of control, span of subordination (i.e., the number of supervisors a subordinate reports to), and formalization. When occupational grouping information was added to the overall regression for role conflict, a significant amount of added variance was explained, apparently reflecting the relatively wide differences in the levels of role conflict reported between groupings. An analysis of the extent to which explained variance in role conflict could be

improved upon by using separate (by-group) regressions indicated that aggregate and by-group solutions were essentially equal on this dimension. However, the analysis with separate occupational groupings indicated that supervisory span, span of subordination, and formalization were somewhat more salient predictors in the secretarial/clerical grouping than for the blue-collar or professional groupings. Participation emerged as the most significant independent predictor of role conflict across all three occupational groupings.

Similar findings resulted from analyses treating *role ambiguity* as the dependent variable, but with two noteworthy exceptions. In the aggregated regression solution for role ambiguity, supervisory span was not a significant influence when considered in the presence of the other five structural properties. To the extent that role ambiguity is sensitive to the number of role senders in a given role constellation, it appears to be most strongly associated with having multiple "work initiators" and not span of control, work group size, or the degree of functional interdependence among role set members. In addition, separate (by-group) analyses indicated that prediction of role ambiguity was significantly improved when regression models were constructed for each separate occupational grouping.

Overall, the results indicate that, *as a set*, the six structural variables included in this study represent significant bases of influence on both role conflict and ambiguity in the samples at hand. Thus, this finding supports the theoretical formulation of Kahn et al., (1964) which views structural properties as important components of role perceptions. In addition, it appears that although the two role perceptions are conceptually distinct, we may expect some common variance between them as a consequence of their shared structural antecedents. Moreover, to experience role conflict and role ambiguity simultaneously is not as incongruous as it may at first seem in that one's perception of conflicting expectations (role conflict) may well be associated with uncertainty about the outcomes of one's behavior (a dimension of role ambiguity).

These results also suggest, however, that the impact on role conflict and ambiguity of *particular* structural properties may be influenced by the characteristics of the occupational grouping to which a given role is ascribed. For example, the analyses for separate occupational groupings suggest that with the exception of participation in decision making, the structural properties represented here are, individually, somewhat more consistently associated with adverse role perceptions among these secretarial/clerical employees than either the blue-collar or professional employees. For these professionals, roles may be too contingency laden for static anatomical properties of the work setting to forestall uncertainties and conflicts about role expectations. For the blue-collar employees, with more routine tasks and tangible outputs, the properties of the organizational setting may be redundant with or of secondary importance to the technological constants of task performance vis-à-vis role deter-

mination. Among the secretarial/clerical employees, by contrast, a greater variety of structural characteristics may be useful in reducing unfavorable role perceptions. Thus, the present findings suggest, albeit tentatively, that the array of structural properties which will prove useful in ameliorating adverse role perceptions may be greatest for roles of moderate complexity (e.g., secretarial/clerical roles) where tasks are relatively routine but the work *context* is dynamic and uncertain with regard to workloads, scheduling, and the multiple publics with whom the role incumbent must deal.

In addition, the present findings provide some evidence for the pervasive impact of participation in decision making on role conflict and ambiguity. Earlier examinations of participation in the context of role perceptions have treated it as a moderator of relationships between role conflict and role ambiguity and their behavioral and attitudinal outcomes (Schuler, 1977). However, the relatively consistent statistical relationships between participation and the two role perceptions which emerged in the present study suggest that such a treatment may not be entirely appropriate. It may be that individuals who are afforded participation will be less likely to experience uncertainty about their roles as a consequence of the increased information and feedback which typically accrue from the participation process. Similarly, the increased personal discretion and autonomy attendant with participation may reduce the role incumbent's exposure to and/or dependence on potential sources of conflicting role expectations.

Several implications follow from these findings. In general, it appears that one key to reducing both role conflict and role ambiguity may lie in providing employees a larger voice in decisions affecting their jobs. For the present secretarial/clerical occupations especially, the benefits of participation vis-à-vis role conflict and ambiguity would seem to be supplemented by providing applicable written rules and procedures concerning the role to be performed (formalization) and by reducing spans of subordination (the number of different work initiators the role incumbent must face). Although the other two occupational groupings in the study were not as sensitive to the *independent* effects of as many structural properties as were secretarial/clerical incumbents, it is possible that such properties, while statistically redundant with participation in these regression models, may function operationally as important preconditions to effective participation; thus, increased participation should not be considered a potential remedy for role conflict and role ambiguity without attention to the potential interaction effects of the other structural properties examined here.

Further research in this area would prove useful on several fronts. First, a greater array of structural variables should be studied in more diverse occupational and organizational contexts in order to gain a better understanding of how structural components of work settings affect role perceptions. Such efforts will prove helpful in assessing the external validity

of the present findings. In addition, future efforts should examine the impact of supervisory behavior in combination with structural characteristics of the work setting. While important to a better understanding of role processes, the latter research focus is absent from the existing literature. Finally, experimental manipulation is consistently absent in the study of role conflict and ambiguity. Thus, a significant contribution could be made by studies which manipulate structural variables under controlled conditions to determine their effects on role perceptions. Such refinements and extensions in future research efforts would facilitate a better understanding of role processes in organizations and would perhaps lead to improvements in both the effectiveness and satisfaction of the employees involved.

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Sex, Locus of Control, and Job Involvement: A Six-Country Investigation

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Attitudinal data on industrial workers in six countries supported the hypothesis that locus of control is significantly related to job involvement, i.e., that internals are more involved in their jobs than externals. The relationship was much stronger for males than for females in five of the six countries. However, virtually identical correlations were found for skilled and unskilled workers in most countries. Further analyses tended to rule out cultural values, worker age, and work experience as being responsible for the observed locus of control-job involvement relationships.

Job involvement—the degree to which one's work is an important part of his or her life—has become an increasingly important construct in both empirical investigations and theoretical speculations about job performance and other worker behaviors. Research on the nature of job involvement in the United States suggests that it is a function of both job characteristics (Lawler & Hall, 1970) and individual characteristics (Wood, 1974).

Of particular interest among individual characteristics investigated is the suggestion that belief in internal versus external control of reinforcement may be related to involvement in work. Wood's (1974) study of differences between highly involved and less involved paper mill workers raised the question of such a relationship. His analyses revealed considerably more significant correlations between job attitudes and behavior among less involved workers than among highly involved workers. Some 28 significant correlations between satisfaction and absenteeism were found for less involved workers. No such correlations were found for highly involved workers.

To account for his findings, Wood suggests that a highly involved worker perceives a stronger and more direct relationship between self-concept and performance than does a less involved worker. Thus, the former is more capable of experiencing intrinsic or self-administered rewards. This description is very similar to Rotter's (1966) description of one who believes in internal (as opposed to external) control of his fate: Such an individual believes that what happens to him is largely contingent upon his own behavior. If internals are more likely to seek control over their own fate, it might be expected that they will also become more involved in their work, and thus be less likely to become apathetic or indifferent.

Early evidence for a relationship between job involvement (JI) and internal-external locus of control (IE) is found in studies of alienation in U.S. industry. These studies suggest that externals tend to be more alienated from their work than internals (Seeman, 1967). Unfortunately, subsequent studies of locus of control in organizational settings have focused on the relationship of IE to job satisfaction and not to job involvement. As Lawler and Hall (1970) point out, job involvement and job satisfaction are different attitudes, although both may be similarly affected by some of the same job characteristics.

More direct evidence of an IE-JI relationship comes from Runyon's 1973 study of 110 chemical employees. In an investigation of interactions between management style and personality variables, Runyon reported an unanticipated inverse relationship between locus of control and job involvement: Internals scored higher on a job involvement measure than externals. Runyon speculated that the relationship might be due to cultural factors, that is, internals were more likely to adopt a cultural work ethic, the prevalent ethic among his subject population being involvement in work. A second speculation was that the relationship was spurious, that both job involvement and locus of control were a function of age.

The findings of Seeman, Wood, and Runyon are all supportive of a possible relationship between locus of control and job involvement. Other evidence, however, would seem to cast doubt on certain assumptions implicit in such a relationship. If highly involved workers are relatively impervious to external evaluations and rewards as Wood (1974) suggests, then it might be expected that internals would be similarly inclined. However, two independent studies indicate that internals are *more* likely, not less likely, to perceive performance-reward contingencies. A study of 207 Navy personnel found internals more likely to perceive rewards as contingent upon job performance (Broedling, 1975). A similar study of 931 hospital personnel found that internals perceived higher performance to reward expectancies than did externals (Szilagyi & Sims, 1975).

The major purpose of this paper is to directly explore the relationship between locus of control and job involvement among industrial workers. The variables are examined among workers from six countries, permitting a test of the generalizability of the relationship as well as of Runyon's

culture-bound hypothesis. Additionally, the effects of certain individual and job characteristics which other research suggests might moderate an IE-JI relationship are explored.

Two major variables which might affect a relationship between locus of control and job involvement are characteristics of the job and sex of the job incumbent. Lawler and Hall (1970) suggest that individuals will become more involved in jobs which allow them control and a chance to use their abilities than in jobs which lack those characteristics. Wood (1974) suggests that job involvement develops from a job which allows the incumbent to experience intrinsic or self-administered rewards. In that vein, it might be expected that skilled jobs will elicit greater involvement than jobs requiring less skill. However, Wood more frequently found significant correlations between satisfaction and behavior for skilled workers than semiskilled workers. If this evidence were to be reconciled with Wood's assumptions about job involvement, it would suggest that skilled workers were less involved (more extrinsically oriented) than semiskilled workers.

The authors' hypothesis is that jobs requiring greater skill should elicit a stronger locus of control-job involvement relationship than those requiring little skill. Since highly skilled jobs should allow the incumbent greater opportunities for intrinsic satisfaction and greater control over outcomes, internals should be more involved in high-skill than in low-skill jobs.

A second variable possibly moderating a locus of control-job involvement relationship is worker sex. There is some evidence across cultures of differences between the sexes in job orientation, at least in certain job categories. A study of 365 males and 301 females in a large U.S. insurance company investigated the importance which workers attached to certain categories of job characteristics (Manhardt, 1972). Males tended to rate advancement and responsibility factors higher than females, while females tended to rate environmental factors higher. A study of 5,800 white-collar workers in Australia investigated relationships among age, tenure, and job satisfaction (Hunt & Saul, 1975). Significant differences in these relationships for males and females suggested differences in expectations and work experiences between the sexes. If differences in job orientations of males and females do exist, because of expectations, experiences, or both, they might be expected to show up in the relationship between involvement and locus of control. However, there is insufficient empirical or theoretical justification for predicting whether the relationship would be stronger for males than for females, or vice versa.

In line with Rotter's theoretical statements as to the nature of the internal-external dimension of individual differences, and with the empirical evidence available as to the relationship between this variable and job involvement, the following hypotheses were tested:

Hypothesis 1—There is a significant relationship between locus of control and job involvement: Internals are more involved than externals.

Hypothesis 2—The relationship between locus of control and job involvement for males differs from the relationship between IE and JI for females.

Hypothesis 3—Job characteristics moderate the IE-JI relationship: The relationship is stronger for high skill than for low skill jobs.

METHOD

Subjects

The data reported here are from a survey of workers in industrial plants at sites in several countries (Reitz & Groff, 1974; Reitz, 1975). All subjects were nonsupervisory workers. Sites included two dairy plants, one battery manufacturing plant, and one shoe manufacturing plant in the Midwestern United States; one shoe manufacturing plant and one industrial components plant in Central Mexico; two shoe manufacturing plants, one office equipment plant, and one automobile parts manufacturing plant in Japan; several sites of a large electronics and telecommunications company and one refrigerator equipment manufacturer in Yugoslavia; one drug company, one shoe manufacturing plant, and one lighting equipment manufacturing plant in Turkey; and one shoe manufacturing plant and one food processing company in Thailand. There were a total of 372 American, 487 Mexican, 716 Japanese, 478 Yugoslavian, 575 Turkish, and 254 Thai workers in the sample.

Instruments

All data were collected as part of a paper-and-pencil attitude survey administered to small groups of workers at the various plant sites by university personnel native to each country.

Locus of control was measured by Rotter's (1966) Internal-External scale, using 20 of his original 23 items. Three of Rotter's original items (five, 10, 23), which deal with academics, were omitted as being irrelevant to the worker populations studied. Scores ranged from 1 to 20. (Low scores indicate an internal orientation, and high scores an external orientation.)

Recent factor analytic studies of the scale have produced from two to four factors. However, the subject populations of these studies, black activists (Gurin, Gurin, Lao, & Beattie, 1969) and college undergraduates (Collins, 1974) were quite different from the adult blue-collar worker population studied here. Despite recent controversy over the factor structure of the scale, the authors felt that the scale is the best available measure of the global construct "locus of control."

Job involvement was measured by a 45-item Likert-scaled instrument developed and validated by Greene (1967). Scores ranged from 41 to 157, with higher scores indicating greater involvement.

Age was worker age at the time of the study.

Work experience was the number of years worked in industry.

Worker skill level was determined by comparing formal job descriptions against categories developed by the U.S. Department of Labor. Each worker was classified as occupying a skilled, semiskilled, or unskilled position.

Back-translation and pretest procedures (Brislin, 1970) were used for instrument translation in each country. The English version was first translated into the native language, then back-translated into English. Comparisons of the original and retranslated English versions were then used to arrive at a native version. The final native version was pretested for comprehensibility on a small sample of workers in each country before being finalized.

Analysis

Data were analyzed by means of Spearman rank-order correlations. Separate data analyses were conducted for each country, and data within each country were further segregated, first by sex, then by skill level.

RESULTS

Results of the data analyses by sex are presented in Table 1. The negative correlations between locus of control and job involvement scores support hypothesis 1: Internals scored higher on the job involvement measure than did externals. However, correlations were consistently significant across cultural settings only for males. For females, only Yugoslavs showed significant correlations between locus of control and job involvement. The data for the other five cultural groups—Americans, Mexicans, Japanese, Turks, and Thais—support hypothesis 2: The relationship between IE and JI differs for males and females.

TABLE 1
Correlations Between Locus of Control and
Job Involvement for Males and Females^a

Country	Males	Females
United States	-.35*	-.15
Turkey	-.22*	-.02
Mexico	-.22*	-.01
Yugoslavia	-.20*	-.20*
Thailand	-.20*	-.06
Japan	-.29*	-.10

^aNs of each group are as follows: United States, 124 males, 248 females; Turkey, 465 males, 110 females; Mexico, 315 males, 127 females; Yugoslavia, 242 males, 236 females; Thailand, 158 males, 96 females; Japan, 519 males, 197 females.

* $p < .005$

Hypothesis 3, that IE-JI correlations would be stronger for skilled than for unskilled workers, was tested by segregating data into skilled, semiskilled, and unskilled worker categories and comparing correlations of the two extreme groups. The results, shown in Table 2, offer no support for hypothesis 3. Correlations between locus of control and job involvement were virtually identical for both skilled and unskilled workers in four of the countries. Correlations were stronger for unskilled than for skilled workers in Thailand and Turkey, but z-scores revealed the differences to be insignificant.

TABLE 2
Correlations Between Locus of Control and
Job Involvement for Skilled and Unskilled Workers*

Country	Skilled	Unskilled
United States	-.21	-.27*
Turkey	-.10	-.24*
Mexico	-.15	-.14
Yugoslavia	-.22*	-.20*
Thailand	-.17	-.24*
Japan	-.28*	-.26*

*N's of each group are as follows: United States, 51 skilled, 171 unskilled; Turkey, 36 skilled, 214 unskilled; Mexico, 80 skilled, 81 unskilled; Yugoslavia, 127 skilled, 205 unskilled; Thailand, 70 skilled, 78 unskilled; Japan, 120 skilled, 91 unskilled.

* $p < .01$

This lack of evidence of skill level as a moderator, together with conflicting evidence cited earlier, led to an a posteriori test of a direct relationship between skill level and job involvement. Correlations obtained for each culture group were as follows: U.S. = .02, Turkey = .08, Mexico = .18, Yugoslavia = .13, Thailand = .07, Japan = .08. Only for Mexican and Yugoslavian workers were the correlations between skill level and job involvement significant ($p < .05$).

DISCUSSION

The results reported here, together with Runyon's 1973 data, lend support to the proposition that internally-oriented workers are more involved in their work than externally-oriented workers, at least when the workers are males (Runyon's sample was all male). While both this study and Runyon's used the same measure of locus of control, even to the elimination of Rotter's three academic items, different instruments were used to measure job involvement. Greene's (1967) longer questionnaire was employed in this study, while Lodahl and Kejner's (1965) short form was used in Runyon's. Obtaining similar findings using a different instrument over several very different worker populations increases confidence that the relationship between locus of control and job involvement exists as

hypothesized. The current data strongly suggest, however, that the generalizability of the relationship may be limited by worker characteristics. The relationship was statistically significant within all six cultural settings only for male workers. While similar relationships were found for female workers in three of the six countries, only among Yugoslavians was this relationship significant.

Whether the IE-JI relationship is affected by job characteristics remains to be seen. Although skill level would seem to be a relevant potential moderator, the current analyses revealed no such effect. Virtually identical negative correlations between locus of control and job involvement were found for both skilled and unskilled workers in four of the six countries.

One of Runyon's speculations about the nature of the IE-JI relationship was that it is a culture-bound phenomenon. The finding that the relationship persists in six very different cultures suggests either that the relationship is not culture-bound or that these six cultures have remarkably similar values about work. Cross-cultural evidence on worker values (Whitehill & Takezawa, 1968; Reitz, 1975) indicates that strong differences in work values among these countries do exist, thus further weakening Runyon's cultural hypothesis.

Runyon further speculated that the IE-JI relationship may have been a spurious one, possibly due to both variables being a function of age. These authors are unaware of any previous direct evidence that either job involvement or locus of control is related to age. Nevertheless, correlations with worker age and work experience were calculated for both job involvement and locus of control. The results, shown in Table 3, reveal that age and work experience were indeed positively related to job involvement in five of the six countries. However, neither age nor work experience were related to locus of control in any of the populations studied. Therefore, if locus of control and job involvement are spuriously related, it is not because of a common relationship to age or work experience.

There remains the problem of explaining why the hypothesized relationship between job involvement and locus of control was significant for

TABLE 3
Correlations of Job Involvement and Locus of Control
With Age and Work Experience

Country	Job Involvement		Locus of Control	
	Age	Work Experience	Age	Work Experience
United States ($n = 372$)	.21*	.15	-.08	-.13
Turkey ($n = 575$)	.13*	.19*	.08	.10
Mexico ($n = 487$)	.27*	.20*	-.08	-.07
Yugoslavia ($n = 478$)	.08	.09	.14	.08
Thailand ($n = 254$)	.16*	.23*	.07	.02
Japan ($n = 716$)	.35*	.39*	-.03	-.04

* $p < .05$

males but not for females. One possibility is that females experience generally less reinforcement than males from the types of jobs studied here. It is also possible that the job orientation of female blue-collar workers differs from that of their male counterparts. For instance, Reitz (1975) found that female workers ranked need for security in their work as significantly more important than did males in the United States, Japan, Yugoslavia, and Thailand.

The finding that the IE-JI relationships were identical for males and females in Yugoslavia leads to speculation that perhaps some form of a cultural hypothesis is not without value. Specifically, in some countries, work experiences and expectations may be quite similar for males and females, while they may be quite different in other countries. The popular media lead one to a general impression that the nature of the work experience for women in Communist or Socialist countries such as Yugoslavia may be more similar to that of men than in other countries. If this is true, the potential for women to be reinforced for factory-type work may be as great as that for men in Yugoslavia. The observations and experiences of the second author while in that country lend support to this notion, although it clearly remains in the realm of speculation for now.

In summary, the findings of this study may be seen as a first effort toward increasing understanding of the psychological and sociological factors which promote involvement in work. Comparing the work experiences and orientations of males and females within cultures would seem to be a fruitful area for further research.

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A Comparative Analysis of Three Diverse Group Decision Making Approaches

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The group decision making approaches investigated utilized a problem requiring high technical quality and high participant acceptance for the successful solution. A leader skill oriented approach (PCL) proved superior on the major variable of effectiveness. Questions are raised regarding the relationship of the problem to the group process employed.

While small group research has branched off in many directions, one area that has received particular attention is the use of groups for solving problems. This research has employed basically two types of problems. The first is where a specific answer is required. Examples of this type are the lost-on-the-moon exercise (Hall & Watson, 1970), true-false tests (Gurnee, 1937), or determining the subjective likelihood of a known condition (Gustafson, Shukla, Delbecq & Webster, 1973). The second is where the subjects are asked a question, and their objective is to generate as many feasible responses as possible. An example of this type is: Name as many uses as you can for a red brick (Bouchard, 1969).

With both problem types, the effectiveness of the decision is based on the quality of the response(s). In the first instance, effectiveness is defined in terms of the response relationship to a "correct" answer. In the second, it is determined by the number of unique responses generated and/or by having a group of judges ascertain the relative merit of each response.

One wonders if these two problem types are representative of the problem population and, furthermore, whether these definitions of effectiveness are complete. Maier (1952) contends that problems should be viewed on two dimensions. The first is what he terms the requirement for a *quality* (Q) decision that is technically appropriate for the situation. His second variable is *acceptance* (A), defined as the extent to which the decision requires the support of those who are to carry it out. He creates a

two-by-two matrix based on these two ingredients and the degree to which a dimension is of high or low importance. Thus, four problem situations are created.

One is where the acceptance requirement is high and quality low, (A/Q). A second is where the requirement for both quality and acceptance is high, (Q, A/0). The third is where the quality requirement is high but acceptance is low (Q/A), and the last is where both are low (0/Q,A).

Using this approach, one can see that the types of problems used in most research have been of the Q/A variety. The effectiveness of the decision is determined by its quality, and the degree of member support is not considered. For example, when a true-false test is administered, the effectiveness is determined by the correspondence of the answers to the correct answers, and the willingness of the participant to support his selection is immaterial. Likewise, when uses for a red brick are considered, quality determined by the quantity of responses does not consider acceptance. While feasibility of the response may be considered in assigning a worth to each suggestion, it does not tap the respondent's desire to make the suggestion work.

Before progressing further, one would logically ask two questions. First, can individuals make meaningful differentiations between quality and acceptance? Second, if differentiations can be made, what is the relative frequency of each problem type?

The answer to the first question is provided by Newstrom (1972). His research clearly indicates that a wide variety of individuals are able to recognize these variables within a diverse problem sample and accurately identify them according to the Maier classification.

The answer to the second question is less definitive. While the relative effect of such variables as organizational type and level has not been adequately investigated, one study (Maier & Hoffman, 1964) found from a sample of 41 different managerial problems that 43.8 percent were A/Q, 33.6 percent were Q,A/0, and 22.6 percent were Q/A. The 0/Q,A classification was not included due to its low quality and acceptance requirements.

This study utilized a Q,A/0 type of problem. While not in numerical terms the most prevalent, it is the most difficult for a leader to handle. In Q/A or A/Q instances, the leader has a primary objective represented by that element of higher importance. While certain leader skills are needed, the approach is dictated, to a larger extent, by the nature of the objective. In the Q,A/0 situation, however, the manager is faced with a dilemma. If he attempts to achieve quality first, either through his own expertise or that of others, he must resort to an imposed solution and faces the real possibility of not being able to gain the necessary level of acceptance. Conversely, if he utilizes participation in order to gain acceptance, quality may not be achieved.

In an effort to investigate this area, three diverse group problem-solving procedures were selected for comparison. These were a nominal approach,

a delphi approach, and an approach called Problem Centered Leadership (PCL).

The nominal process used was developed by Delbecq and Van de Ven in 1968 from social-psychological studies (Van de Ven, 1974). The procedure is as follows: (a) Individuals solve or suggest solutions to a problem on their own; (b) their ideas are presented via a structured format to other group members; (c) the ideas of all members are discussed; (d) the group arrives at a decision via secret ballot.

The delphi process, originated by Dalkey and Helmer (1963), is similar to the nominal approach in some respects but differs in the following ways. First, the group members do not meet face to face, thus autonomy is maintained. Second, all communication among members is in writing. Third, once the initial decisions have been reviewed, all participants are asked to make another decision. These subsequent decisions may be the same as the original or different. This decide-review-decide process continues until a consensus is reached or the preestablished number of interactions is completed. The last difference is that a design and monitoring team provides the necessary group coordination.

The approach of Problem Centered Leadership (PCL) is derived from the work of N. R. F. Maier (1952). The approach makes use of certain skills which, according to Maier, assist a leader in enhancing the effectiveness of a decision. Included are abilities to:

1. State a problem in such a way that the group does not become defensive, but instead approaches the issue in a constructive way. The leader executes this by (a) presenting the problem in situational terms (for example, "How do we make the job more safe" is preferred over "How do we get the employees to be more careful" because the former concentrates on the situational aspects of the problem while the latter passes judgment and limits the universe of possible solutions); (b) not suggesting alternative solutions to choose from; (c) not indicating a preference for a solution; (d) not criticizing any possible solutions.
2. Supply essential facts and clarify the area of freedom without suggesting a solution. This is achieved by issuing a relatively short statement which includes the relevant facts without evaluating their importance or usefulness.
3. Draw persons out so that all members will participate. This is attained by (a) protecting the individual's right to express his feeling or idea; (b) preventing talkative individuals from dominating the conversation; (c) requesting opinions from silent members; (d) making individuals feel their ideas are wanted.
4. Restate expressed ideas and feelings more briefly, accurately, pointedly, and clearly. To accomplish this, the leader capsulates the idea/feeling without expressing agreement or disagreement.
5. Ask questions that stimulate problem solving behavior. This is achieved by directing the group thought into areas that have not been

explored or have been insufficiently investigated. Questions such as: "How will this influence morale?" or "How will our suppliers react?" are illustrative of the use of questions.

6. Summarize as the need arises. The intent of this skill is to (a) move the discussion along; (b) indicate progress; (c) indicate differences of opinion.

What the PCL approach attempts to do is organize these skills into a sequential leadership or process centered format.

The process is divided into five different steps. The first, presentation of the problem and relevant information, emphasizes the leader's ability to present the problem in an objective, unbiased manner which will not pre-judge any individual or limit the universe of possible solutions. The second, initial discussion of the situation, accentuates the leader's ability to get everyone to express, without fear, their feelings about the situation. The third, continued discussion, emphasizes the leader's ability to get the group to explore both the positive and negative aspects associated with the situation. The fourth, solution generation and decision making, stresses the need to separate solution generation and evaluation as well as the leader's ability to stimulate group thought. The last, determination of decision acceptance, enables the leader to ascertain the degree of support the group will give the decision.

This approach differs from the other methods presented. With the other alternatives, the actual behavior of the leader, aside from following a sequential format, is not prescribed. In the nominal or delphi condition, a leader could conceivably follow the sequence but employ a very authoritarian mode of behavior. The PCL approach attempts to overcome this deficiency by providing both a procedure and specific skills to employ. The danger and the benefit with the approach is that the responses are not "canned" but rely on an effective evaluation of the situation and an application of the appropriate skill.

METHOD

Problem

The problem used was a role-playing exercise entitled "Change of Work Procedures" (Maier, 1952). It deals with a subassembly situation involving three men and their foreman. Time-study data reveal that each man is most efficient at one of three positions. The men presently rotate equally between positions, but time-study data indicate that efficiency will improve if each man works only on his best position. However, the workers are opposed to such a change. They fear rate cuts, increased boredom, management intentions, and they question the ability of the time-study man. The problem thus raises issues based on fact and reality as well as on adverse feelings.

Subjects

Two hundred and forty subjects from three diverse undergraduate populations were utilized. This sampling was deliberate in order to obtain heterogeneity on such variables as age, supervisory experience, and exposure to PCL concepts.

All the leader roles were filled by older, more experienced evening students. PCL leaders were drawn from an introductory organizational behavior course where they had received exposure to Maier's leadership skills approximately six months prior to the experiment. The training for the PCL leaders involved approximately six in-class hours consisting of lecture, discussion, and exercises aimed at improving their leadership skills. The nominal and delphi leaders were drawn from introductory management courses. With the possible exception of some PCL leaders having previous exposure to the delphi concept, the other leaders had no known exposure to any of the approaches other than their own due to the introductory nature of the course from which they were drawn.

Subsequent demographic data revealed that there was no significant difference between any of the leader groups on the variables of age, sex, length of supervisory experience, number of subordinates supervised, and type of employment (full or part time). The leaders were also significantly older and had significantly more work experience than the students who assumed worker roles.

Normal Procedure

Nominal group leaders were given approximately a half an hour lecture and discussion centering on a checklist which outlined the sequence of nominal events that each leader was to use. Thereafter, the procedural steps were as follows:

1. Groups (leader plus three randomly chosen members) were formed.
2. A short explanation of role playing was given.
3. The introduction to the exercise was read, and questions were fielded if they arose.
4. The materials (ballots, decision forms, time study data) necessary to solve the problem via the nominal method were distributed. Just prior to the start of the exercise, the leaders were instructed to inform the investigator when a decision was reached (tie votes were broken by the foreman's choice).
5. When the leader indicated that a decision had been reached, he was given a form to record the decision. After this, each member was instructed to fill out an acceptance questionnaire.

Problem Centered Leadership Procedure

PCL leaders were given approximately a half-hour instruction which included a review of the basic leadership skills and an initial exposure to the

PCL sequence and how these skills should be incorporated. The PCL procedure deviated from the nominal in the following ways:

1. A decision was not determined by a vote but rather by the group arriving at unanimous agreement.
2. No material other than roles was provided.

Delphi Procedure

The delphi groups were given approximately a half-hour explanation of the method. The procedure differed from the nominal approach in the following respects:

1. Group members were assigned to a predetermined seating arrangement so they could not ascertain their group composition.
2. The investigator and a monitoring team provided the necessary coordination.
3. When a decision was reached, either by consensus or a vote on the last round (a maximum of seven iterations was used), the investigator separately informed the members of the decision.

Statistical Analysis

Since the independent variable in this experiment is qualitative, analysis of variance was used to determine the statistical relationship between the independent variable and the dependent variables. A fixed effects model was selected (Neter & Wasserman, 1974). The analysis centered on factor level means of quality, acceptance and effectiveness.

The quality index (Q) was determined by computing the maximum, minimum, and actual number of operations the workers could produce per day using the role data (Table 1) and the decisions reached. The minimum (339.8) and maximum (457.1) number of operations was defined by each man working all day in either his least effective or most effective position respectively. The actual number of operations was computed according to the amount of time each worker spent at each position. For example, if the decision reached was for each man to work four hours at his two fastest positions, then 410.6 operations could be completed and the quality index would be .60 using the following formula:

$$\text{Quality Index} = \frac{\text{Actual Number of operations} - \text{Minimum possible operations}}{\text{Maximum possible operations} - \text{Minimum possible operations}}$$

Thus, the index had a possible range of .0 to 1.0.

The level of acceptance was determined by utilizing the responses of the workers to an acceptance questionnaire. This questionnaire asked the respondent how he felt about the decision reached and included 11 statements ranging from wholehearted support for the decision to wholehearted disapproval. Statements between these extremes centered

TABLE 1
Role Play Data on Operation Time Per Worker by Position

<i>Worker</i>	<i>Position 1</i>	<i>Position 2</i>	<i>Position 3</i>
Jack	3 minutes	4 minutes	4½ minutes
Walt	3½ minutes	3½ minutes	3 minutes
Steve	5 minutes	3½ minutes	4½ minutes

around various degrees of support. An interval of .1 was established between each response giving a possible range from .0 to 1.0. This measure was pretested and found to not only correlate highly (.92) with the Likert scale of equal dimensions but was preferred by the respondents.

The fact that these two measures are important and need to be combined is generally recognized. Maier (1963) contends that the relationship should be $Q \times A = \text{decision effectiveness}$. For the purposes of this paper, this formula is utilized. Thus, the effectiveness index was obtained by multiplying the quality index by the average worker acceptance for each group.

RESULTS

Quality

The PCL approach (Tables 2 and 3) achieved indexes higher than did either of the alternative methods. Although the *F* ratios for the PCL

TABLE 2
Mean Result by Treatment and Variable

<i>Treatment</i>	<i>Quality Index^a</i> (<i>n</i> = 20 groups/ treatment)	<i>Acceptance Index^b</i> (<i>n</i> = 60 workers/ treatment)	<i>Effectiveness Index^c</i> (<i>n</i> = 60/ treatment)
PCL	.720 ^a	.780	.561
Nominal	.624	.753	.467
Delphi	.615	.766	.456

^aQuality indexes ranged from .40 to 1.0.

^bAcceptance indexes ranged from .0 to 1.0.

^cEffectiveness indexes ranged from .16 to .83.

TABLE 3
***F* Ratios for Comparison by Variable**

<i>Comparison</i>	<i>Quality</i>	<i>Acceptance</i>	<i>Effectiveness</i>
PCL-Nominal	2.08	.55	6.8**
PCL-Delphi	2.78*	.15	9.3**
Nominal-Delphi	0.02	.09	0.8
PCL-Nominal-Delphi	1.61	.24	5.4**

**p* ≤ .10

***p* ≤ .01

comparisons did not reach the level $p = .05$ of significance, they did approach it. The PCL-delphi comparison was significant at $p \leq .10$; the PCL-nominal was $p \leq .16$. The nominal-delphi comparison failed to achieve any meaningful level of significance.

Acceptance

None of the treatments yielded statistically significant relationships. While the PCL approach (Tables 2 and 3) had the highest mean acceptance index, the indexes for all treatments were virtually identical.

Effectiveness

The effectiveness of the decision is the major variable in this study because it represents a functional relationship between both dimensions of quality and acceptance. While neither the quality nor acceptance indexes alone achieved levels of significance, the combination of the two (effectiveness) demonstrated the superiority of the PCL approach (Tables 2 and 3). When comparing PCL to the other two alternatives, the former approach had results over 20 percent higher than either of the others. This led to a high level of significance ($p \leq .01$).

Additional Results

Up to this point, solution quality has been discussed only in terms of the quality index. However, Maier and Thurber (1969) suggest that each solution may be classified into one of the following categories:

1. *Old solutions*—The previous system of equal rotation is continued with minor variations such as giving more training, helping more, et cetera. The quality index would equal .40.
2. *New solutions*—The time-study man's suggestion is adopted, and each man works at his fastest position all day. The quality index would equal 1.0.
3. *Integrative solutions*—These are decisions that increase productivity by the workers spending more time in their faster positions but still maintain some degree of rotation to reduce boredom. All men rotating between their two best positions or all men spending a higher proportion of time in their fastest position are examples of this category. The quality index would be $> .40$ but < 1.0 .
4. *Other solutions*—This category includes decisions where production is not increased beyond the status quo but boredom is increased. The quality index would be $\leq .40$. Having each man work at one position for a week before rotating to the other positions in subsequent weeks is illustrative of this decision type. Production would not be increased, since the time spent at each job over the three-week period

would be identical to the present system of equal rotation, but boredom would be increased due to the infrequency of rotation.

The reliability of this classification method was investigated using three professors at this author's university. The interrater reliability was very high at .96.

A distribution of these types of decisions across treatments is found in Table 4. While all treatments have approximately the same number of "integrative", "new" and "other" decisions, the PCL approach had no "old" decisions as compared with four for the nominal approach and five for the delphi method. It is interesting to see how worker acceptance changes in respect to the decision type (Table 5). As the type of decision progresses from old to other, total worker acceptance decreases.

TABLE 4
Frequency Distribution of Decision Types According to Treatment

<i>Treatment</i>	<i>Old (%)</i>	<i>Integrative (%)</i>	<i>New (%)</i>	<i>Other (%)^a</i>
PCL ^b	0 (0)	14 (70)	5 (25)	1 (5)
Nominal ^c	4 (20)	10 (50)	4 (20)	2 (10)
Delphi ^d	5 (25)	12 (60)	3 (15)	0 (0)
Total	9 (15)	36 (60)	12 (20)	3 (5)

^aDue to the uniqueness and infrequency of "other" decisions, this category was not included in χ^2 computations.

^b $\chi^2 = 15.89$, $df = 2$, $p \leq .001$

^c $\chi^2 = 4.00$, $df = 2$, *n.s.*

^d $\chi^2 = 6.69$, $df = 2$, $p \leq .05$

TABLE 5
Mean Worker Acceptance Index of Each Decision Type by Treatment

<i>Treatment</i>	<i>Old</i>	<i>Integrative</i>	<i>New</i>	<i>Other</i>
PCL	—	.80	.73	.80
Nominal	.85	.78	.69	.54
Delphi	.85	.79	.65	—
Total	.85	.79	.70	.62

The observed and recorded behavioral differences between the three processes are also of interest. With each process there are varying degrees of documentation, and thus some degree of caution must be exercised. For the delphi approach, there is a complete record of all transcriptions. With the nominal approach, there are copies of all suggestions, ballots, and the personal observations of the author. Postexperimental discussions with the leaders and personal observations are used for the basis of PCL comments.

The delphi transcripts show a high degree of involvement. Eighty percent of these groups went to at least the fifth round before a decision was reached. While it would be difficult to classify all the groups in any one decision making approach, there seemed to be a general win-lose

atmosphere within the messages. In virtually every group, there were indications of coercion, persuasion, and/or the offer of reward. Conflict seemed to be the rule, not the exception. The end result can be seen to some extent in the percentage of dissatisfied workers (.4 or lower on the acceptance measure). Thirteen percent of the workers indicated some degree of dissatisfaction. While in absolute terms this may not seem high, it does seem high compared to a dissatisfaction rate of 3 percent for PCL.

Part of this conflict may be explained by the positions taken by the leaders and workers. On the first round, 80 percent of the leaders recommended the adoption of the new method of work. The workers, on the other hand, strongly recommended that there be no change in the work procedures.

Many of the same comments made for the delphi approach seem to also apply for the nominal method. Eighty-five percent of the leaders included the adoption of the new method as one of their initial suggestions. The workers generally suggested staying with the old method. When conflict occurred, the approach the leaders took cannot be generalized. It ranged from autocratic to participative. A review of the ballots indicated that 50 percent of the groups did not reach unanimous agreement. As with the delphi approach, this may explain the relatively high dissatisfaction rate of 13 percent.

The PCL approach had the least "formal" process documentation. While observations were made and debriefings were conducted, only general comments can be presented. Since PCL has both a skill component and a procedure component, comments about both are in order. In respect to procedure, the PCL leaders, as with the nominal and delphi leaders, adhered to the sequence of events they were to follow. In the area of skill orientation, they seemed to be successful, but there were instances where increased skill was required. In general, there did not seem to be the same conflict atmosphere that was evident in the other two procedures.

DISCUSSION

Before progressing, some caveats must be issued. First, due to the subject population (mostly juniors), this cannot be considered a truly randomized design. As McNemar (1946, p. 333) stated, "The existing science of human behavior is largely the science of the behavior of sophomores." While efforts were made to incorporate reality by utilizing largely experienced leaders, one is still cautious about generalizing the results beyond the population specified. Second, the PCL leaders had completed a course in organizational behavior while the others had not. What effect, if any, this had on the outcome is unknown, but it should at least be identified as a moderating variable. Third, the possibility of experimenter expectancy effects (Rosenthal, 1969) are present. Being aware of Van Osten's horse Hans makes one almost paranoid about being in the same room with one's subjects. It is felt, however, that the following conditions

at least minimized the likelihood of this event occurring: (a) The experimenter standardized the introductory portion of all treatments as much as possible; (b) the subjects were not aware of the other treatments being administered; (c) the experimenter did not come in proximity with the group until a decision was reached; (d) the decisions reached, due to a vote or a unanimous agreement, were determined by a group of subjects (workers) that the experimenter had never met; (e) the acceptance indexes were determined entirely from a group of subjects the experimenter had never met. While these conditions may not alleviate all fears of an experimenter expectancy effect, they at least minimize the possible impact of such an effect.

Given these cautions, the superiority of the PCL approach as a method for obtaining solution effectiveness seems particularly significant in view of (a) the relatively high skill requirements of the leader and (b) the minimal training given in these skills. Given minimal skill training, the method itself appears largely responsible for the superiority of the results obtained.

While both the delphi and nominal methods allow expression of feelings, there is no indication how such expressions should be handled by the leader. Both approaches tend to concentrate on the intellectual or quality portion of the problem with little acceptance emphasis. The PCL approach, on the other hand, does specifically address the need for acceptance, and this inclusion seems to have led to its superiority. An analysis of individual acceptance reveals an interesting point. It was found that the acceptance index was negatively correlated ($-.14$) to the quality index. Assuming normality, this relationship is marginally significant at $p \leq .07$. This finding may be explained given the roles of the workers. As the quality index increases, the frequency of rotation decreases. Yet such a change conflicts with the desires of most of the workers. The adoption of the new solution can be viewed as a loss for the workers and maintaining the old, a win. Table 5 clearly shows this negative relationship.

These data lend additional support to the previously established superiority of the PCL method using the effectiveness index. Given that the overall relationship between quality and acceptance is strongly negative and PCL had by far the highest quality index (Table 2), one would expect PCL to have the lowest acceptance index. However, we find this is not the case. Rather than the lowest, PCL had the highest mean acceptance index. In addition, a breakdown of mean acceptance indexes by decision type (Table 5) reveals the PCL had the highest index for all its decision categories. In other words, the PCL method overcame resistance to change to such an extent that it not only achieved the highest mean quality index but also the highest mean acceptance index.

While PCL is new, it is interesting to see how closely this approach parallels a situational theory of leadership advanced by Vroom and Yetton (1973). With the type of problem employed (Q,A/0), these authors advocate a G11 approach which involves sharing the problem with



subordinates. They also recommend that the leader not try to influence the group to adopt "his" solution. The same general philosophy is embodied in the PCL concept. While PCL is more explicit in its design, both approaches recognize that the effectiveness of a decision is not dictated solely by the quality element but must also include the need for acceptance.

Implications

While the question of the PCL superiority has yet to be completely understood, the answer seems to rest with the nature of the problem. In a Q/A situation, the individual is confronted with a cognitively oriented problem situation. The success or failure of the decision rests with the correspondence of the answer to an external condition. With these problems, we seem to find that a nominal process (Gustafson, Shukla, Delbecq & Webster, 1973) structures the sequence of events in such a way that the cognitive process is facilitated. However, a problem also requiring a high level of member support adds not only a new dimension but a managerial dilemma. If a leader attempts to resolve the quality issue first, as the nominal and delphi approaches do, he is left with the problem of gaining member support. As this research seems to indicate, he is able to get the support (acceptance) but at the expense (compromise) of the quality. The PCL approach recognizes that the successful solution to such a problem requires both. In problems involving a high level of acceptance, feelings are very important because the person has to live with the decision reached. The success will be dependent particularly on his effort. Feelings create tension. For the solution to be successful, it is necessary to relieve this tension prior to problem solving. The PCL approach provides such a cathartic avenue by discussing feelings prior to solutions. Thus, it is able to achieve not only a high level of acceptance but also a high level of quality, both of which lead to a more effective decision. This research implies that the nature of the problem may govern, to a much larger extent than generally recognized, the decision making process to be utilized.

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Source Credibility, Information Favorability, and Job Offer Acceptance¹

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The impact of the favorability of information about a job and the source of information upon applicant perception of source credibility and upon job offer acceptance was examined. Results showed that interviewers are the least credible source and that giving negative job information enhanced source credibility but decreased job offer acceptance.

For much of its history, the science of industrial psychology has been concerned with the way organizations gather information and make decisions about job applicants. Only recently has attention been directed toward the applicant's need for valid information about the organization and the way in which this information is gathered and processed by the applicant in order to arrive at the decision to accept or reject a job offer. This paper will address two aspects of information about the job which seem to be important in influencing applicant decisions, the source of the information and its favorability.

The information a job applicant receives about a job can come from a variety of sources including interviewers, other company employees, or friends and acquaintances not directly associated with the organization. The source from whom information is obtained should influence the applicant's reaction to that information. "We know that an individual's

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acceptance of information and ideas is based in part on 'who said it'' (Berlo, Lemert, & Mertz, 1969, p. 563). Porter, Lawler, and Hackman elaborate, "... (I)ndividuals attach varying degrees of credibility to information that reaches them through different channels" (1975, p. 142). The concept of credibility and its application to sources of job information will be discussed in more detail below.

Hovland, Janis, and Kelley (1953) listed three determinants of source credibility. The first of these was trust. An individual whose motives and intentions are trusted is more likely to be accepted as credible than an individual who is clearly trying to persuade or influence. This suggests that in an employment setting the interviewer or recruiter may be suspect as a source of information since typically one of his or her goals is to "sell" the organization to the applicant. Sources outside the organization may not be perceived as possessing this motivation and thus may be seen by the applicant as more trustworthy.

Another important determinant of credibility is expertise. One is most likely to listen to and believe an individual who is perceived as being very knowledgeable about the subject at hand. This may imply that within-company sources such as interviewers and especially job incumbents may possess high credibility in the eyes of the applicant by virtue of their experience with the job and the organization.

A third factor which may influence credibility according to Hovland et al. is liking for the source. From the job applicant's point of view, this may mean that friends or favorite professors are credible sources of information.

The authors could locate only one piece of research on the credibility of various sources of job information. In that study, Sorensen, Rhode, and Lawler (1973) found that accounting students felt that the most credible sources of information about careers in accounting were professors and other accounting students. This finding is consistent with the above view of credibility, since accounting professors and other accounting students should be seen as having trustworthy motives, expertise (especially the accounting professors), and be liked (especially the accounting students).

The present study attempted to determine the perceived trustworthiness, expertise, and liking for four common sources of job-related information as well as the relative influence of these sources on the decision to join the organization. The four sources considered in this research were the on-campus interviewer/recruiter, a job incumbent encountered on a plant trip, a friend who previously interviewed with the company, and a professor.

In addition to the source of information about the job, the applicant is obviously influenced by the content of the information, specifically its favorability. It is commonly accepted that the more positive the information, the more likely it is that the applicant will view the organization favorably and accept a position with it. Yet, the wisdom of presenting only positive information to job applicants has recently been questioned.

Research has shown that realistic job descriptions which include the unfavorable as well as the favorable aspects of a job do not make it more difficult to recruit and hire qualified individuals (Macedonia, 1969; Wanous, 1973, 1977) and in fact may make filling the positions easier (Weitz, 1956). In addition, creating realistic expectations about the job by giving both positive and negative information frequently reduces turnover among new organization members (Farr, O'Leary, & Bartlett, 1973; Ilgen & Seely, 1974; Katzell, 1968; Weitz, 1956).

This study attempted to replicate the results of Wanous (1973, 1977) and Macedonia (1969) with respect to the effects of information favorability on job offer acceptance. In addition, the effects of information favorability on source credibility were evaluated. One might suspect that giving unfavorable information would increase source credibility, since an individual giving unfavorable information might be seen as being more trustworthy and more knowledgeable about the job.

To sum up, this research investigated the effects of information source and information favorability on source credibility and job offer acceptance. It was expected that systematic differences in the credibility of the four sources of information dealt with would emerge and that sources would generally be seen as more credible when they gave unfavorable information. Job offer acceptance might also have been affected by information sources, but should not have been decreased by unfavorable (realistic) information about the job.

METHOD

The study used a two by four factorial design with two levels of information favorability (positive and negative) and four sources of information (on campus interviewer/recruiter, friend, job incumbent, and professor). Cell sizes varied from eight to 14.

Job information was presented in a written form as six questions and answers about a job. Subjects were asked to imagine that they had applied for the job described and had gathered the information presented in a face to face discussion with one of the four sources. After reading through the job information, subjects answered questions about source credibility and whether or not they would accept the job. Both the information presented and the questionnaire items used will be discussed in more detail below.

Seniors from the business school at Purdue University served as subjects. They were mailed the job information and questionnaire together with a brief letter requesting their help on a study of "how people use the information they gather about jobs." Ninety usable questionnaires were returned. This represents a 40 percent response rate. The relatively low response rate is attributed to the fact that questionnaires were mailed near the end of the semester when most students were occupied with finals or were in the process of leaving for the summer.

Job Information

Six questions about the job were selected and the same six were presented in both the favorable and unfavorable information sets. Three of the questions concerned the intrinsic job facets of variety, autonomy, and opportunity to use valued skills. The other three concerned the extrinsic aspects of pay, promotion, and working conditions.

The answers to these six questions differed in the favorable and unfavorable information sets. A total of 38 possible answers were developed and piloted. One hundred subjects from an introductory psychology class were asked to rate the favorability of each statement about the job on a seven-point scale. Anchors on the scale were: 1 = very unfavorable, 4 = neutral, and 7 = very favorable. Answers were classified as positive if their mean rating was between 4.5 and 5.5 and as negative if their mean rating was between 2.5 and 3.5. The answers to the six questions used in the actual study were selected from the piloted answers which fell into these ranges. Extremely positive or negative answers were not used in order to avoid overshadowing the source effect.

The positive information set contained four positive answers and two negative answers, which were always presented in the same order, + + - + + -. The negative (realistic) information set contained four negative answers and two positive answers, always presented in the same order, - - + - - +. The information sets are presented in Table 1.

Sources of Information

One of the following four paragraphs introduced each information set to establish the information source:

Interviewer—Assume that the following are some excerpts from an interview you recently had at the University Placement Office. You spoke to the interviewer from Company A for quite a while and asked a number of questions. After the interview, you were invited to come on a plant trip, and you accepted. The following are some of the questions you asked, along with the answers you received.

Friend—Assume that you are about to go on a plant trip to Company A. Before leaving, you talk to a good friend who graduated last spring. You know that your friend interviewed with a number of firms, including Company A. Some of the questions you ask your friend about Company A along with the answers you received appear below.

Incumbent—Assume you recently went on a plant trip to Company A. While you were there, you met a person holding the same type of job you are being considered for. You spoke to this person quite a bit over lunch in the company cafeteria. The following are some of the questions you asked, along with the answers you received.

TABLE 1
Items Included in Positive and Negative Information Sets*

<i>Information Set</i>	<i>Questions and Answers</i>
	Q: I really want to put to use the things I've spent four years learning. Will this job let me do the things I'm trained for?
+	A: Full use is made of your training right from the start. Anything else wouldn't be wise use of personnel. (+)
-	A: This entry level job may not make too much use of your skills and training, but should you be promoted up to the next level, these skills will definitely be required. (-)
	Q: How would you evaluate the opportunities for promotion from this job?
+	A: The promotional opportunity is good. If you're competent, you won't be overlooked. (+)
-	A: You will eventually be promoted, but the competition is really rough. It's a dog-eat-dog company. Of course, this means that only the very best make it to the top and are extremely well rewarded for it. (-)
	Q: How would you describe the working conditions on this job?
+	A: The working conditions are adequate for what you need, but not excessive. You are provided with an office but nothing fancy. Furthermore, the support such as equipment and clerical personnel is sufficient for your usual needs. In peak times, or if you have some special requirements, an effort will be made to provide things for you but it sometimes is not possible to meet these special needs, for example, to get a report out quickly. (-)
-	A: The offices are modern, air conditioned, and organized very efficiently by department. Each department is well equipped with most necessary office equipment and has a secretarial staff that can usually handle the work load. (+)
	Q: How would you describe the salary on this job?
+	A: The pay is quite good. Starting salaries are usually about 5 percent higher than the starting salaries for similar positions with other companies. Furthermore, once with the company, they run about 5 percent higher than the industry average. (+)
-	A: The pay is not bad but not great either. Starting salaries are usually 5 percent lower than starting salaries for similar positions with other companies. (-)
	Q: Does this job offer a lot of different things to do, or will I be doing much the same things most of the time?
+	A: Well, any job is as interesting as you make it. Some of the work you'll be doing will be rather routine, but you'll get your share of the exciting projects too. (+)
-	A: Well, there's no getting around it, this job has its routine aspects. (-)
	Q: How much will I be "on my own" in this job?
+	A: Well, I guess you'll be on your own to some degree, as long as you stay within the specific guidelines we give on how to do each job. (-)
-	A: You'll be pretty much on your own. You'll be responsible for getting your job done with little checking from anyone else. (+)

*The + or - in the column headed Information Set tells whether that answer was included in the favorable (+) or the unfavorable (-) information set. The + or - following each answer is the sign of that particular answer.

Professor—Assume that you are about to go on a plant trip to Company A. Before leaving, you go to see a professor who is quite knowledgeable about many of the companies which recruit on campus, including Company A. You ask the professor a lot of questions about Company A. The following are some of these questions, along with the answers you received.

Note that the level of interest expressed by the company in the applicant and vice versa is the same in all cases: A plant trip has been offered and accepted.

Dependent Variables

A number of Likert items followed the information set to assess the subjects' attitudes towards the source and company. Trust in the source was measured by the following three items: (1) I feel this person is extremely trustworthy; (2) I believe this person is telling me the truth as he sees it; (3) I feel this person is not being honest with me (reverse scored). Coefficient alpha for these three items was .68.

Perceived expertise of the source was also measured by three items: (1) This person really knows a lot about this company; (2) I consider this person to be an extremely credible source of information about the job; (3) this person really knows what he is talking about. Coefficient alpha for these items was .81.

Since affect may sometimes be involved in credibility, a scale was constructed to measure liking for the source. It contained the following items: (1) This person seems like a very nice person; (2) I believe I would really like this person; (3) I really don't care to get to know this person any better (reverse scored). Coefficient alpha for this scale was .79.

Finally, the decision which would be made based on the information and source was tapped by a choice-of-company scale made up of the following items: (1) I am very interested in pursuing my application with this company; (2) I would be very willing to accept a job with this company if offered one; (3) I would really like to work for this company; (4) I feel I know enough about this company to no longer be interested in it except as a last resort (reverse scored). Coefficient alpha for this scale was .83.

These 13 items were mixed in with 11 filler items. The response format was a five-point scale, anchored as follows: 5 = strongly agree, agree, uncertain, disagree, 1 = strongly disagree.

RESULTS

Intercorrelations among the four dependent variables ranged from .17 to .58, with the median correlation being .45. Since the dependent variables were correlated, a multivariate analysis of variance was performed first using SPSS MANOVA (Cohen & Burns, 1976). The multivariate main effect for source of information was significant at the .01 level (Wilks' lambda at 4, 3, 86 degrees of freedom = .679) as was the multivariate main effect for sign of information (Wilks' lambda at 4, 1, 86 degrees of freedom = .718). Since the multivariate tests were significant, univariate unweighted means analyses of variance were performed to locate the differences. Tables 2 and 3 present the ANOVA summary tables, cell means, and main effect means for these analyses.

For the first dependent variable, trust in source, there was a significant main effect for source of information. A Newman-Keuls test on the four sources of information means showed that the most trusted people were

TABLE 2
Analysis of Variance Summary Tables for Trust in Source, Expertise of Source, Liking for Source, and Choice of Company

Source of Variance	df	Dependent Variables							
		Trust		Expertise		Liking		Choice	
		MS	F	MS	F	MS	F	MS	F
Source of Information	3	1.05	3.08*	3.12	7.07**	1.74	4.96**	1.43	3.12*
Information Favorability	1	3.19	9.41**	5.36	12.15**	.44	1.24	2.27	7.12**
Source \times Favorability	3	.20	.59	1.49	3.38*	.10	.29	.45	.98
Residual	82	.33		.44		.35		.45	

* $p < .05$ ** $p < .01$

TABLE 3
Means on the Four Dependent Variables in Each Treatment Condition

Dependent Variable	Source of Information				Main Effect Means for Sign of Information
	Interviewer	Friend	Professor	Incumbent	
Positive Information from Each Source					
Trust in Source	2.63	3.26	2.96	3.28	3.03
Expertise of Source	1.85	3.19	2.33	2.74	2.53
Liking for Source	2.44	3.24	3.00	3.02	2.93
Choice of Company	2.67	3.32	3.19	3.25	3.11
Cell Size	9	14	8	14	
Negative Information from Each Source					
Trust in Source	3.30	3.46	3.30	3.62	3.42
Expertise of Source	2.81	3.00	2.83	3.46	3.03
Liking for Source	2.70	3.26	3.27	3.05	3.07
Choice of Company	2.39	2.77	3.15	2.56	2.72
Cell Size	9	13	10	13	
Main Effect Means for Sources of Information					
Trust in Source	2.97	3.36	3.13	3.45	
Expertise of Source	2.33	3.10	2.58	3.10	
Liking for Source	2.57	3.25	3.14	3.04	
Choice of Company	2.53	3.05	3.17	2.91	

the job incumbent and the friend and the least trusted was the interviewer ($p < .10$). There was also a significant main effect for information favorability such that people were more trusted when they gave negative as opposed to positive information.

The analyses of variance on perceived expertise of source showed an interaction effect and two significant main effects (see Table 2). An inspection of the means revealed that the friend was seen as being relatively knowledgeable regardless of information favorability, while all other sources were seen as being somewhat more knowledgeable when they gave negative information. The latter effect reached the .05 level of significance for the interviewer.

For the dependent variable of liking the source, only the source of information effect was significant. The interviewer was significantly less liked than the friend, professor, and incumbent ($p < .05$).

For the final dependent variable, choice of company, both main effects were significant. The main effect for favorability indicates that subjects were more likely to accept a job with the company if they were given positive information. The source of information effect indicates that getting information from some sources was more likely to lead to choosing the company than getting information from other sources. Tests on the means showed that subjects were substantially less likely to accept the job if their source of information about the job was the interviewer ($p < .05$).

DISCUSSION

Several possible patterns of source of information effects were suggested in the introduction. First, it was suggested that sources outside the company might be the most trusted, since they would probably not be trying to persuade the applicant to take the job. It was found that both the most and least trusted sources were within the company—the incumbent and the interviewer, respectively. It also was suggested that the most expert sources would be inside the company. In fact, the least expert source was inside the company—again, the interviewer. It was thought that the best liked source would probably be outside the company, individuals the applicant already knew such as friends or professors. This turned out to be the case, and the incumbent was also well liked. The interviewer was the least liked source by a considerable margin. There was also a source of information effect on choice of company. Applicants were quite reluctant to accept a job with the company when their only source of information was the interviewer. They were not beset by such doubts when their only source was a friend, an incumbent, or a professor.

It is disturbing to discover that the predominant stereotype of the on-campus interviewer/recruiter is so negative. This source is the first and often only representative of the company seen by applicants, yet he or she is not liked, not trusted, and not perceived as knowing much about the job.

The significant main effect for information favorability suggests one way to improve the credibility of the interviewer. The results showed that sources are much more trusted when they give unfavorable information. With the exception of the friend, sources are also attributed greater expertise when they give less favorable information. Thus, the interviewer should be able to enhance his or her credibility by telling the applicant about the undesirable aspects of the job as well as the desirable ones.

However, this approach to increasing credibility may have unfortunate side effects. In this study, subjects who received negative information were significantly less interested in working for the organization than subjects who received positive information. Even though interviewers seem to have

relatively little impact on applicants' choice of the company, they may still tend to drive away qualified applicants if they give unfavorable information.

Finally, one might ask why the job acceptance rate was lower for the negative information group in this study when this effect has very seldom occurred in past research with realistic job previews. Two explanations come to mind. First, it may be due to the questionnaire nature of this study. If a real job offer had been involved, subjects may not have been so ready to turn it down. Second, the effect may be due to the type of subjects used. The subjects were highly qualified college graduates in the process of looking for their first permanent job at the time they participated in the study. They may have been looking for "the perfect job" to a greater degree than either more experienced or less highly qualified job seekers and thus may have been less tolerant of negative information about the job. This explanation suggests that more research on the realistic job preview is needed using samples from different populations of applicants. Specifically, it is necessary to determine empirically the point at which the benefits of decreased turnover may be overcome by the detrimental effects on job acceptance for different types of applicants.

In sum, this study represents a first step towards understanding the applicant's side of the employee selection process. It has been shown that both sign and source of job information affect source credibility and job offer acceptance. Specifically, it was found that interviewers are a low credibility source of job information, that unfavorable information is more credible than favorable information, and that applicants are more likely to accept jobs when the information about them is favorable and the source of information is not the interviewer. Future research in this area might focus on the way impressions of a potential employer are formed and changed, and on the weights given to the various job aspects (intrinsic, extrinsic, social) in the applicant's final decision process.

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Influence and Information: An Exploratory Investigation of the Boundary Role Person's Basis of Power

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This paper examines the boundary role person (BRP) as an influence agent and investigates an aspect of his potential ability to influence the decision outcomes of other organizational members. It was found that as their information requirements increase under conditions of higher perceived environmental uncertainty, the constituent members attribute to the BRP greater power in the decision making process. The results further suggest that, in light of the BRP's position in the transference of information across the organization's boundary, the reliance on expert power appears to be the most effective basis of social power for dealing with other organizational members.

The boundary role person (BRP) occupies a unique position in a firm's interaction with its environment (Adams, 1976). It has been hypothesized that as a firm's external environment becomes more turbulent and unstable the information processing function of the BRP becomes central to a firm's ability to effectively gather, analyze and act on relevant information (e.g., Aldrich & Herker, 1977; Leifer & Delbecq, 1978). The potential dependency relationship, growing from the BRP's ability to "cope with" (Thompson, 1967) or "absorb" (March & Simon, 1956) uncertainty for those other organizational members, affords boundary spanners an excellent opportunity to enhance their position of power within the organization. Recent anecdotal evidence suggests, for example, that much of the improved corporate status afforded to the purchasing function is a direct result of the severe materials shortages of 1973-74. Although eventual corporate recognition was inevitable, those turbulent environmental conditions served to hasten management's acknowledg-

ment of purchasing's important role in the acquisition, importation and processing of information crucial to the firm's survival.

Following in the tradition of Kahn, Wolfe, Quinn and Snoek (1964), researchers (e.g., Keller & Holland, 1975; Miles, 1976; Organ & Green, 1972; Wall & Adams, 1974) have focused on the conflicting influences exerted on BRPs by both their constituents (i.e., other members of the organization) and persons outside of their organization. From these studies has emerged a better understanding of affective factors which might impair a BRP's ability to effectively execute his important boundary spanning activities. Yet, a BRP is also a role sender—an influence agent—attempting to influence the decisions and behaviors of those individuals with whom he interacts. Not only must the BRP negotiate with BRPs from other firms who do not share the same goals and preference orderings (e.g., Frey & Adams, 1972), the boundary spanner must also, at times and to varying degrees, bargain with his own constituents. For example, Strauss (1962) has described the various power tactics of "bureaucratic gamesmanship" utilized by purchasing agents to enhance their position of influence during the procurement decision making process.

The purpose of this paper is to examine BRPs as influence agents by investigating aspects of their relationships with those constituents with whom they regularly interact during the performance of their jobs. Specifically, this paper focuses on the purchasing agent and his interactions with members of the buying task group (BTG) (i.e., those constituents responsible for purchasing related decisions). As it appears that the importance of the BRP's boundary spanning activities increases as the constituents require greater amounts of environmental information, one objective of this research is to examine whether the degree of power attributed to the purchasing agent by the other BTG members is associated with their level of perceived environmental uncertainty. The second objective deals with a related issue and focuses on the individual power-related behaviors of BRPs. Since BRPs, in general, have little if any formal authority over their constituents, the goal here is to examine what base(s) of social power purchasing agents utilize in their dealings with other BTG members.

POWER IN BOUNDARY ROLES

Attributed Power as a Function of Dependency

Viewing power as the inverse of dependency, Emerson (1962, p. 32) posited that "the dependence of actor *P* upon actor *O* is 1) directly proportional to *P*'s motivational investment in goals mediated by *O*; and 2) inversely proportional to the availability of those goals to *P* outside of the *O-P* relationship." Incorporating Emerson's conceptualization in an open systems framework, Thompson (1967) conceived of the organization

as an interdependent, decision making system in which the primary goal was to reduce the degree of uncertainty with which it had to contend. In response to unmanageable levels of environmental uncertainty, Thompson posited that organizations create specialized parts (i.e., boundary spanning units) to cope with these contingencies. As a result of this structural adaptation, boundary spanning units presumably foster an imbalanced dependency relationship among organizational subunits by devoting more energy to monitoring crucial environmental contingencies (see Aldrich & Herker, 1977; Thompson, 1967). Moreover, this increased boundary spanning activity places the BRP (here the purchasing agent) in the role of gatekeeper, thereby potentially increasing his or her ability to control, channel and reformulate available environmental information (Pettigrew, 1973; Rosen, 1976). Commenting on the important information processing function served by the BRP, Aldrich and Herker (1977) note that as constituents grow more dependent on the BRP's ability to filter the flow of information, the BRP's potential power position is further enhanced.

Hickson, Hinings, Lee, Schneck and Pennings (1971) have more formally presented the notion of intraorganizational power-dependency relations in a "strategic contingencies" model. Building on earlier research (e.g., Crozier, 1964; Emerson, 1962; Thompson, 1967), Hickson et al. (1971) posit two structural properties as conceptual determinants of power. They hypothesized that work flow centrality (i.e., the degree to which a subunit's activities are interlinked into the system) and non-substitutability (i.e., the ability of an organization to obtain alternative performance for the activities of a subunit) would contribute to the degree of organizational power. On one level, one can see that a degree of dependency (and, therefore, power) should accrue to purchasing by virtue of its specialized function and centrality to the work flow of the firm. Traditionally, however, purchasing agents were viewed as order takers/expeditors and, as a consequence, much of their boundary spanning activity was preempted by other departments. In many cases, the filtering and representative roles (see Adams, 1976; Miles, 1976) of the BRP were under-utilized and the potential boundary relevance of purchasing was not realized.

The need for purchasing agents, as BRPs, to heighten their monitoring activity was dramatically brought to the fore during the severe materials shortages of the mid-1970s. As the purchasing environment grew more turbulent, the purchasing agent's centrality became more salient, presumably, as a result of the crucial role played by a BRP in the acquisition, importation and processing of purchasing-related information. One can easily envision purchasing agents bolstering their unique gatekeeper role through their contacts with outside sales personnel, knowledge of potential and/or actual problems in the marketplace with respect to material availability, information regarding alternative sources or substitute material, and so on.

It can be seen that as a BRP is able to reduce uncertainty for the constituents responsible for purchasing-related decisions, they become dependent upon him/her as a source of information. Purporting that this dependency confers upon the BRP a position of power, both Crozier (1964) and Perrow (1972) observed that power tends to be related to the kind of uncertainty upon which depends the life of the firm. In the present context, the BTG is devoted to purchasing-related decision making. It is important to recognize, however, that it is not uncertainty per se that confers power; rather, it is the ability to cope with uncertainty that determines the degree of power achieved by the BRP. As the information demands of the constituents diminish—under conditions of lower environmental uncertainty—the coping mechanism becomes less crucial, the need to absorb uncertainty abates, and the BRP's power dissipates.

Power, in this context, is defined as the ability to influence decision making and is quite consistent with the definitions posited by Dahl (1957) and other power theorists. Further, it should be noted that the present conceptualization of power dependency parallels the Hickson et al. (1971) "strategic contingencies" paradigm and, as a result, is also shaped by structural constraints. In many respects, the preceding discussion suggests a latent power which must be exercised if the true impact of the BRP's power is to be realized. Similarly, Simon (1953) has suggested that the magnitude of a power resource might be employed as a measure of power. Thus, the actual power of a BRP is probably a function of the bases of power available to him at any given time. This distinction is maintained by Hickson et al. (1971, p. 218) who state "if the direction of the dependence in a relationship is determined by an imbalance of power bases, power itself must be defined separately from these bases."

Bases of Power and Constituent Compliance

Cyert and March (1964) were among the first to contradict the rationalistic approach to organizational decision making; they observed that since organizational members often do not share the same preference orderings, goals, et cetera, power is often exercised to affect decision outcomes. Indeed, as Schein (1977, p. 64) noted, "power struggles . . . may be as endemic to organizational life as planning, organizing, directing and controlling." Patchen (1974), building on the conceptual framework of French and Raven (1959), examined the various bases of power by which the various individuals participating in purchasing-related decisions exert more or less influence on procurement decision outcomes. Despite the fact that the research did not focus exclusively on the power bases exercised by purchasing agents (as BRPs) to further their influence, Patchen's study contributes to an understanding of the particular bases of power utilized to affect organizational decisions.

The decision to employ either a reward, coercive, expert, referent or legitimate base of power has certain consequences which may affect future

interactions and subsequent power attempts (Baldwin, 1971; Raven & Kruglanski, 1970). Not only do BRPs (or any influence agent, for that matter) have to weigh the costs associated with the exercise of power (see, Harsanyi, 1962), they must also consider the impact of their influence attempts on the long-run relationships with their constituents. For instance, although coercive and reward power are both socially dependent, requiring constant surveillance by the powerholder, the use of coercive power tends to result in heightened conflict and hostility. The exercise of reward power, on the other hand, appears to encourage continued interaction but is also less likely to contribute to a long-term power-dependent relationship, since the withdrawal of positive sanctions is apt to result in the less powerful person's reversion to his previous behavior. Further, the effect of the inducement, even if continued, is subject to diminishing utility.

The exercise of referent and/or expert power tends to foster a more cooperative, prolonged relationship between individuals. Expert and referent bases of power are seemingly more subtle in their impact, and research suggests that a degree of shared values and goal congruence may lie at the core of the emergent power dependent relationship (Raven & Kruglanski, 1970; Raven, 1974). The point is that if BRPs are to influence the decision outcomes of other constituent members, they need to devise tactics (i.e., power strategies) for most effectively dealing with these organizational members. In many cases, the decision can be quite problematic because BRPs do not have the traditional leverages of hierarchical authority (i.e., a legitimate basis of power) at their disposal (Cleland & King, 1968). Therefore, if BRPs are to successfully manifest their power, they need to develop a power strategy which is, at the same time, consistent with their base(s) of power and the consequence they desire (see, Schein, 1977).

Interestingly, Patchen's (1974) results suggest that influence on specific purchasing decisions often appears to be determined by those norms which accord influence to those with greatest stake in the decision. Of the five bases of power posited by French and Raven, expert power followed by legitimate power seemed to be the next two most frequently mentioned bases of influence. Patchen (1974, p. 216) also notes that reward, coercive power and, to a lesser extent, referent power were "noticeable chiefly by their absence." It should be noted again that this study did not attempt to isolate the bases of power exercised by a particular organizational member and, therefore, while furnishing important behavioral insights may not be directly transferable to an investigation of the specific power bases exercised by BRPs.

In an attempt to contribute to an understanding of the BRP as an influence agent, the present study examines two important research questions emerging from the literature cited above: (1) Is the level of power attributed to purchasing agents (as BRPs) associated with the level of their constituents' perceived environmental uncertainty, and (2) what bases of

social power are exercised by purchasing agents, as BRPs, to enhance their power position?

METHOD

The Sample

The sample consisted of 20 firms from the greater Chicago area. These firms represented 11 different industries of which 70 percent served mainly industrial markets and the remainder served mainly consumer markets. Using a sociometric technique (e.g., Patchen, 1974), BTG membership was determined by asking the purchasing agent the names and titles of those constituents with whom he interacted with respect to purchasing-related decisions for the commodity for which he was responsible. Purchasing agent centrality merely served to anchor a BTG's purchasing-related responsibility to a particular commodity. While each decision represented a commodity (21 different classes ranging from edible fats, to steel, to metal fasteners) which was of considerable importance to each firm in the sample, the study focused on rather repetitive purchasing decisions. More specifically, each procurement decision typified a modified rebuy situation in which the various BTG members "...have relevant buying experiences, but the experience factor is not complete because new alternative suppliers, items or marketing services are being considered" (Robinson, Faris & Wind, 1967, p. 26).

Defined as an informal decision making unit (see, Spekman, 1977), the BTG exemplifies a conceptualization of the lateral relationships (often cutting across formal lines of authority) which emerge as a result of the procurement process. The focus of the BTG is on the relationships which develop between the purchasing agent and those other organizational actors (i.e., production/manufacturing people, R&D engineers, quality control personnel, sales managers and the like) with whom he/she interacts during the purchasing decision making process. In this fashion, the BTG defines a measurable communications network in which the objective is making purchasing-related decisions for a particular commodity or class of commodities.

Each BTG members' questionnaire accentuated the interactive, multiperson nature of the procurement process. (The reader can obtain copies of the research instrument from the author.) Moreover, the respondents were told that they were designated as members of a particular BTG "because part of your job entails interacting with a purchasing agent with respect to the decision to purchase commodity X." (Towards the end of the questionnaire, each respondent was asked to respond to the question: "To what extent do you feel you are a part of the buying task group?" All respondents retained in the final sample affirmed their participation in the BTG.) During March-April 1976, 400

respondents were either personally administered or mailed questionnaires. In total, there were 322 usable questionnaires (an 80.5 percent response rate).

Measures

Environmental Uncertainty—With full recognition of the debate regarding the use of objective versus perceptual measures of environmental uncertainty (see Downey & Slocum, 1975; Tosi, Aldag & Storey, 1973), an 11-item, perceptual measure of uncertainty ($\alpha = .68$) was adopted from Duncan (1972). In order to capture the relevant task environment, the scale was modified to (1) focus exclusively on purchasing-related decisions and (2) reflect the entire range of information inputs impinging on the BTG. Specifically, attention was given to purchasing relevant factors external to the BTG but internal to the firm as well as factors external to both the BTG and the firm. The following questions will illustrate the distinction between the domains of the relevant task environment:

Relative to your role in the BTG, how often are you certain about what procedures would be best for dealing with purchasing related problems that arise outside your company?

Relative to your role in the BTG, how often are you certain about what procedures would be best for dealing with purchasing related problems that arise in other departments in your company?

It can be seen, therefore, that purchasing decisions can be affected by such external factors as government regulations and economic conditions as well as by internal considerations with respect to material tolerances, production estimates, sales forecasts and so on.

Attributed Power—The power construct ($\alpha = .78$) focused on the degree to which the purchasing agent was perceived by his constituents to influence the purchasing decision making process. Consistent with other power theorists (e.g., March, 1955), attributed power was utilized to measure the influence of the purchasing agent within the BTG. As the scope of this study was limited to the procurement process, a specific item measure (Patchen, 1963), adopted from the Robinson et al.'s (1967) "buy phase," was employed to assess the purchasing agent's influence in the sequence of decision making activities which are performed during the purchasing process. Specifically, the power scale examined the purchasing agent's influence in an eight-step succession of purchasing-related events beginning with "problem recognition and/or anticipation" and ending with the "evaluation and inspection of goods upon delivery."

The Bases of Social Power—The operationalization of the French and Raven typology presented several difficulties, not the least of which was the lack of a clear external criterion. A 15-item scale was constructed to tap the bases of social power (i.e., three items for each power base). Reflecting a high degree of face validity, these questions examined the

reasons other BTG members state they "follow suggestions or fulfill requests made by the purchasing agent." The operationalization of the power bases was depicted as:

- (Reward) "He can give special help to those who cooperate with him."
- (Coercive) "He can penalize those who do not follow his suggestions."
- (Legitimate) "He has a legitimate right, considering his position, to expect that his suggestions will be carried out."
- (Referent) "I respect him personally, and want to act in a way that merits his respect and admiration."
- (Expert) "I defer to his judgment in areas in which he is more familiar than I."

A factor analysis, using VARIMAX rotation, was utilized to examine whether the "bases of power" scale did, indeed, represent five distinct constructs, each tapping a unique conceptual space. Such a "single common factor" approach has an implicit objective of construct validity. In effect, an operational measure is a valid measure of a construct if it relates in the way that a concept "should" to measures of other related constructs. As can be seen from Table 1, the factor analysis extracted four factors with eigenvalues greater than 1.0. It is interesting to note that all three of the expert power scale items (factor III) loaded heavily on one factor. Reward, referent and, to a lesser degree, legitimate power loaded heavily on two factors (factors I and II), thus appearing to tap a conceptual property space which can be described as a more inclusive, noncoercive base of power. This more complex construct seems to support the notion that the bases of power are rarely used independently and, specifically, referent power is often exercised in combination with one or more of the power bases (Raven, 1971). It can be seen that the ambiguous distinction between referent power and other power bases is accentuated further by the high factor loading of a referent power scale item on factor III (expert power). Finally, factor IV is suggestive of a coercive base of power but, due to the mixed loadings of the coercive power base items, must be subject to guarded interpretation.

It should be noted that in an effort to avoid the operational difficulties associated with the French and Raven typology, marketing researchers (e.g., Hunt & Nevin, 1974; Lusch, 1976) have abandoned the five bases schema and have, instead, adopted a coercive/noncoercive power base classification. While this consolidation achieves parsimony and solves many empirical problems associated with differentiating the bases of power, it is felt that this approach also loses valuable information. Since an objective here is to more fully investigate the various power bases exercised by BRPs in their attempts to influence constituent decision processes, a compromise approach was utilized. Rather than retain the five bases as independent constructs due to the high intercorrelations among

TABLE 1
A Factor Analysis of the Bases of Social Power

<i>Scale Items Denoting the Base of Social Power</i>	<i>Factor I</i>	<i>Factor II</i>	<i>Factor III</i>	<i>Factor IV</i>
I respect him personally, and want to act in a way that merits his respect and admiration	.711	.200	.341	-.035
I respect his competence about things he is more experienced than I	.371	-.003	.642	-.232
He can give special help to those who cooperate with him	.771	.094	.119	.285
He can apply pressure on those who do not cooperate with him	.616	-.038	-.103	.564
He has a legitimate right, considering his position, to expect that his suggestions will be carried out	.115	.029	.102	.120
I defer to his judgment in areas in which he is more familiar than I	.088	-.086	.850	.207
He can make things difficult for me if I fail to follow his advice	.434	.087	.011	.630
Because he is the purchasing agent I am obligated to follow his suggestions	.152	.511	-.023	.268
I can personally benefit by cooperating with him	.672	.349	.067	.302
Following his advice results in better decisions	.069	.223	.547	-.025
I cooperate with him because I have high regard for him as an individual	.282	.406	.640	-.036
He can penalize those who do not follow his suggestions	.236	.162	.050	.751
I feel I have to cooperate with him	.001	.457	-.008	.649
I cooperate with him because I wish to be identified with him	.273	.794	-.050	.117
Cooperating with him can positively impact on my performance	.065	.762	.232	.201
Eigenvalue	5.06	2.03	1.32	1.02
Percentage of Cumulative Variance Explained	33.7	47.2	56.0	62.8

the power bases (see Table 2), the two highest factor scores on each extracted factor were combined to create four bases of power (i.e., noncoercive I and II, expert and coercive.)¹ In this manner, problems associated with multicollinearity were minimized and much of the descriptive information of the five-base schema could be retained.

ANALYSIS AND DISCUSSION

While Allen (1966) discusses the flow of information across boundaries as a technical problem, Pettigrew (1972) and others conceive of the BRP's unique position in the information flow as a potential power resource.

¹Although a legitimate power item had a higher factor loading on the coercive power factor (factor IV) than the second coercive power item, it was not included in the final model. Exclusion of the legitimate power item was based primarily on the greater difference between the mixed loading scores on the second coercive power item.

TABLE 2
Zero-Order Correlation Matrix of the Bases of Social Power ($n = 206$)

	REFPOW	EXPOW	REWPOW	COERPOW	LEGPOW
Referent Power (REFPOW)	1.00	.455***	.605***	.401***	.465***
Expert Power (EXPOW)		1.00	.317***	.124*	.193**
Reward Power (REWPOW)			1.00	.607***	.496***
Coercive Power (COERPOW)				1.00	.554***
Legitimate Power (LEGPOW)					1.00

* $p < .05$

** $p < .01$

*** $p < .001$

These findings support the positive relationship between the level of perceived uncertainty and the power attributed to the purchasing agent ($r = .351, p < .01$). It can be inferred that the power of the purchasing agent emanates from a dependency built on the flow of material (Hickson et al., 1971 refer to this as work flow centrality) and the flow of information. Since the importance of purchasing to the continued flow of production goods is felt to be relatively constant regardless of the level of uncertainty, the positive correlation seems to suggest that coping with uncertainty fosters a greater dependency as the perceived level of uncertainty increases.

The notion of dependency is reinforced by further analysis suggesting that BTG members operating under conditions of greater uncertainty perceive purchasing to exercise greater influence in other than purchasing related issues than those BTG members operating under conditions of lesser perceived uncertainty ($t = -4.80, p < .01$). While the actual scope of the purchasing agent's influence was not probed, the point is that BRPs (in their gatekeeper role) sit at the juncture of many communication paths and, therefore, collect and filter information that can potentially impact upon the decision outcomes of many constituents, some of whom share no regularized task related activities with the purchasing agent. It can easily be envisioned that as long as the purchasing agent is perceived to effectively filter and channel environmental information, and the information is deemed crucial, the scope of his/her power can presumably extend to such diverse areas as product design, long-range planning and other traditionally nonpurchasing areas.

Related to the notion of power dependency is the issue of the means by which BRPs, as influence agents, exhibit their power. Table 3 summarizes data examining the power-related behavior utilized by the purchasing agent in his/her power attempts. In many respects, this model is felt to depict the strategies by which the purchasing agent's power becomes

TABLE 3

The Basis of Power as Predictors of Power: Multiple Regression Summary Table

<i>Independent Variables</i>	<i>Beta Weight</i>	<i>Cumulative R²</i>	<i>F (to add)</i>
Expert Power	.356	.139	25.80**
Coercive	-.067	.142	0.73
Noncoercive I	.079	.145	0.94
Noncoercive II	-.043	.146	0.37
Overall Model			8.61*

* $p < .01$ ** $p < .001$

manifest. It becomes readily apparent that the significance of the entire model ($F = 8.61$, $p < .01$) and slightly over 90 percent of the explained variance (13.9 percent) is directly attributable to the expert base of power. This finding is consistent with the notion that the BRP's base of power is primarily a result of his ability to gather and filter information deemed crucial by his constituents. Whether as a result of the purchasing agent's experience, access to information, or familiarity with purchasing-related issues, the BTG members appear to rely on the BRP to improve their decision outcomes. Conceptually, and from the perspective of the BRP, the utilization of expert power leads to greater cooperation and heightened dependence (see Raven & Kruglanski, 1970). Interestingly, Strauss (1962) observed that those purchasing agents concerned with improving their status and expanding their influence tended to rely on "educational tactics" which could easily be interpreted as the development of expert power-based behavior. From the perspective of the BTG members, however, other research indicates that a strong dependency can be problematic, since BRPs can conceal and misrepresent information, thereby presenting to their constituents a distorted, self-serving view of the environment (Rosen & Adams, 1976).

A tendency to rely on expert power is mirrored in findings by Patchen (1974), who reported that a person's knowledge, experience or access to information were frequently mentioned as reasons an individual was influential in a decision. It is interesting to note that while Patchen (1974) also observed the use of legitimate power (or authority) as a prevalent basis of power, legitimate power was not included in the final model by virtue of its poor and/or mixed factor loadings. Since the purchasing agent has no formal authority over other BTG members, it is not surprising to find that legitimate power is not a viable power source in the present context. Moreover, Strauss (1962) noted that "rule oriented" tactics were not employed by the more influential purchasing agents who preferred to operate informally so that they could more easily "bend the rules" to achieve their own objectives.

The reader is cautioned, however, not to interpret these findings as suggesting that BRPs rely *solely* on expert power in order to influence decision outcomes. From Table 4 it can be seen that one of the noncoercive

TABLE 4
Zero-Order Correlation Matrix Between Attributed Power
and the Bases of Social Power

	<i>Noncoercive Power I</i>	<i>Noncoercive Power II</i>	<i>Expert Power</i>	<i>Coercive Power</i>
Attributed Power	.1463*	-.0113	.3635**	-.0095

* $p < .05$

** $p < .001$

power bases is also related to attributed power ($r = .146$, $p < .05$), although there is a significantly stronger association between attributed power and expert power ($p < .05$). (Hotellings' t was used to test for the significance of the differences between the two correlation coefficients.) This finding seems to accentuate the nebulous distinction between expert power and the other noncoercive power bases. This correlation matrix serves to temper the above discussion and tends to suggest that while expert power emerges as the dominant explanatory power base, its effective utilization may be tied, to some extent, to the BRP's exercise of a combination of power bases—in this case, other noncoercive power bases.

The weak support given to the BRP's utilization of referent power (as a component of the noncoercive power-based factors) is consistent with Patchen's findings (1974). Yet, both Adams (1976) and Organ (1971) recommend developing a referent power base as a viable strategy for BRPs to compensate for their lack of formal authority when dealing across boundaries. These findings seem to indicate that reliance on referent power alone may not be a successful tactic for the present sample of purchasing agents. This discrepancy may be due, in part, to the present research context. That is, since purchasing is perceived by many to be a low-status position, it would follow presumably that the purchasing agent would not serve as a basis for association and/or identification. While generalization beyond this research setting may be tenuous, it is interesting to note that both reward and referent power converge on the same factor. Perhaps this indicates that purchasing agents, cognizant of their lower status, attempt to gain and/or enhance personal loyalty and respect by "buying" (i.e., rewarding) their constituents.

The use of coercive power does not appear to be a suitable power base for dealing with constituents. Patchen (1974, p. 216) interprets the absence of sanctions (both rewards and punishments) as a result of demand characteristics emanating from a "reluctance to talk about such models of influence." A richer explanation, probing the interpersonal dynamics of the procurement process, might reflect the costs associated with the exercise of sanctions. That is, if a purchasing agent threatens another BTG member with certain reprisals for nonperformance of a specified behavior and the threat is not carried out, the purchasing agent has suffered a loss of credibility. Further, the use of rewards, while more conducive to

prolonged compliance, may lead to strained relationships because some constituents may come to expect favors and the purchasing agent's repertoire of rewards is quite limited.

Finally, it should be noted that while these findings appear to substantiate the conceptual relationship between environmental uncertainty and the power attributed to the purchasing agent as well as the purchasing agent's subsequent reliance on expert power, these results are subject to guarded interpretation. Given that the purchasing agent has traditionally been viewed as a low-status corporate member who often had no input whatsoever into the purchasing decision making process, it is not surprising to find the absolute mean score of the attributed power construct is rather low ($\bar{X} = 2.282$, range = 1.82). (The power construct was measured on a five-point Likert scale with a score of 1 connoting "little, or no influence.") Therefore, the low overall score may be viewed as reflecting relative measures of high and low power, remembering that the enduring "order-taker stereotype would probably mollify the opportunity for the purchasing agent to achieve a great deal of absolute influence during the purchasing process.

CONCLUSION

This exploratory field research has empirically investigated aspects of the conceptual linkage between boundary spanning activity and the information requirements of the BRP's constituent members. The BRP has been examined as an influence agent and his base of power has been shown to emerge from his potential ability to channel, if not control, the flow of information into his firm. It can be inferred from these findings that the purchasing agent's tendency to rely more heavily on expert power supports the notion that the BRP's power resides primarily in his ability to cope with uncertainty for his constituents. Moreover, these findings suggest that the exercise of expert power is a means by which a BRP can better sustain a continued dependency relationship thereby assuring himself an influential voice in the decision making process. Despite the contextual limitations of this study, this research has reaffirmed the importance of the boundary role person in the acquisition, importation and processing of environmental information.

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The Effects of Signal Probability on Inspection Accuracy in a Microscopic Inspection Task: An Experimental Investigation¹

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Two laboratory tests and a field test demonstrated that inspection accuracy in a microscopic inspection task varied as a function of signal probability. Implications for inspection task design are discussed.

Colquhoun (1961) was the first to investigate the effects of signal probability on inspection accuracy. His pioneering work demonstrated a positive relationship between signal probability and the percentage of signals detected in a simple form of monitoring inspection task.² In particular, he found that the probability of an inspector detecting a signal decreased as the probability of a signal occurring decreased. Signal probability was defined by Colquhoun as the ratio of signals to stimulus events. Applied to the inspection of manufactured products, signal probability is synonymous with defect rate or incoming fraction defective. A signal is any task-related stimulus that the inspector is instructed to detect. For instance, the signals in an industrial inspection task would be the nonconforming items the inspector is instructed to detect and the stimulus events would be the items actually inspected, both conforming (nonsignal stimuli) and nonconforming (signals or signal stimuli).

Colquhoun's original finding has been supported by the research of numerous other investigators studying a variety of simplified forms of unaided visual scanning and monitoring inspection tasks (e.g., Sosnowy,

¹These data are from a consulting report submitted by the author to the National Center for Toxicological Research, Pine Bluff Arsenal, Arkansas. Portions of the report were presented at the 7th Annual Midwest AIDS Conference, Detroit, 1976.

²Harris and Chaney (1969) identify three basic types of inspection tasks: (1) scanning, which is most commonly performed visually, (2) measurement, and (3) monitoring. Visual scanning tasks can be classified as unaided or aided. An unaided task is one in which the inspection is performed with the unaided eye, or without the aid of visual extending instruments or devices other than eyeglasses. An aided task is one in which some instrument or device such as a magnifying glass or microscope is used to extend the visual capabilities of the inspector.

1967; Wallack, 1967; Baddeley & Colquhoun, 1969; Fox & Haslegrave, 1969; Williges, 1971). Another fairly consistent finding of previous research is that the percentage of false reports³ (i.e., the inspector makes a decision error in falsely or incorrectly reporting a nonsignal stimulus as a signal stimulus) increases as signal probability decreases. The results of this research suggest a potential problem in using information obtained from visual inspections. When signal probability is low, inspectors may not be very accurate. The percentage of signals detected is likely to be low and the percentage of false reports is likely to be high. Consequently, control decisions based on information obtained from visual inspections may be in error. These findings have implications for the design of inspection jobs or tasks. Management should be aware of the "signal probability effect" and be prepared to counteract it. However, the findings of prior research designed to determine the effects of signal probability on inspection accuracy should be applied to the design of inspection tasks only with considerable caution.

One reason for caution pertains to the type of inspection tasks studied. All of the research to date has dealt with either unaided visual scanning or monitoring inspection tasks. As a consequence, the information obtained from this research is most directly relevant to these two types of inspection tasks. The findings may not be relevant to other types of tasks. Also, because of the simplified forms of the inspection tasks studied, the findings may have no applied relevance even to the types of tasks studied. The signals to be detected in these studies typically were easily recognizable, requiring little or nothing in terms of a standard for comparison and therefore little judgment on the part of the inspector. As a result, the simplified inspection tasks considered in the studies may not have a close parallel in the real world (Kibler, 1965; Smith & Lucaccini, 1969). A closely related reason for caution is that most of the studies have been conducted in the laboratory (Chapanis, 1967; Harris & Chaney, 1969). And, of greater concern, the laboratory findings typically have not been validated in the field (Baker, 1964; Harris, 1969).

The present study was designed to investigate the effects of signal probability on inspection accuracy in a relatively complex form of a visually-aided scanning task. The inspection task was one in which a microscope was required to extend the visual capabilities of the human inspector as he searched for infrequently occurring complex signals. The inspection task considered in the present study is rapidly becoming prevalent in government, private, and independent toxicology testing laboratories as we become increasingly concerned with the control of toxic substances (see, for example, *Business Week*, April 21, 1973; May 11, 1974; October 25, 1976; April 11, 1977).

³The two *inspector decision errors* discussed in this article, missing signals and making false reports, differ from the customary *Type I* and *Type II* errors associated with statistical quality control. *Type I* and *Type II* errors are a function of the sample size and the variability incurred in the sampling program.

Since the microscopic inspection task has some elements in common with the types of tasks studied in previous research, the findings of this research may suggest the general nature of the relationship between signal probability and inspection accuracy in a microscopic inspection task. Thus, one would predict from previous research that inspection accuracy would decrease with reductions in signal probability. But, lacking experimental and empirical evidence directly relevant to the signal probability effect on inspection accuracy in a microscopic inspection task, it was decided in the present research that actual experimentation would furnish the only basis for rational decision making regarding the design of this type of task.

Two hypotheses formed the basis for the study. The first hypothesis stated that the mean percent of signals detected would decrease with reductions in signal probability. The second hypothesis stated that the mean percent of false reports would increase with reductions in signal probability.

BACKGROUND OF THE STUDY

An existing real-world inspection task was studied in order to increase the applied relevance of the investigation. The inspection task is performed by parapatologists at the National Center for Toxicological Research (NCTR). The NCTR is a joint venture of the Food and Drug Administration and the Environmental Protection Agency established in January, 1971 as an international resource to be used in the study of adverse health effects resulting from exposure to chemical substances found in our environment. Laboratory animals are exposed to long-term, low-level dosages of selected chemical compounds in some of the NCTR toxicology experiments. When an animal dies or is serially sacrificed at specified time intervals, tissue slides prepared from its organs are examined by a parapatologist who makes an initial evaluation of the normality or abnormality of each tissue. All tissues evaluated as abnormal are then examined, evaluated, and analyzed by one or more pathologists. The results of the microscopic examinations are used to extrapolate the effects of the chemical compounds from laboratory animal to humans.

Six parapatologists were employed by the NCTR when the study was carried out, although more would be employed at a later date when trained. The primary job of the parapatologists was to detect signal slides, or microscope slides of abnormal tissue. However, from the view of effectively utilizing the pathologists' limited time, the number of false reports could not be excessive.

The study was conducted prior to a series of long-term, low-dosage experiments at the NCTR in some of which the predicted occurrence of certain tissue abnormalities was .001, a signal probability considerably lower than those used in practically all of the studies cited earlier. Under these circumstances, the NCTR inspection task provided an excellent oppor-

tunity to investigate the potentially negative effect of signal probability on inspection accuracy in a microscopic inspection task. Furthermore, identifying signal probability as negatively affecting inspection accuracy on a real-world inspection task such as this would suggest a technique for improving inspection accuracy, since evidence exists that this variable can be manipulated by management to achieve this purpose.

METHOD

Experimentation

The study consisted of three experiments, a pilot experiment and two main experiments. Only the two main experiments (identified as experiment I and experiment II) are reported here in any great detail. A severe, externally-imposed time constraint made it impossible to conduct extensive experiments on-site at the NCTR. Therefore, so that a more practically useful but less time consuming experiment could ultimately be conducted on-site at the NCTR (experiment II), the pilot experiment and the first main experiment (experiment I) were conducted in the laboratory under controlled conditions.

The pilot experiment was designed to determine the quantitative effects, if any, of signal probability on inspection accuracy in a task that simulated the dynamics of the NCTR inspection task. Twenty-seven student volunteers served as naive experimental subjects. They searched for signals appearing at three signal probabilities: .0125, .025, and .05. Since each subject was tested at each level of signal probability, 81 observations were made. The stimulus events in this experiment were slides prepared to simulate the characteristics of the microscope slides used in the later experiments. The results of the pilot experiment indicated that signal probability had a statistically significant negative effect ($p < .01$) on the mean percent of signals detected. The second dependent measure of inspection accuracy, the mean percent of false reports, increased as signal probability decreased but not to a significant level ($p < .25$).

Experiment I was designed to more closely approximate the NCTR operational situation by having trained student subjects perform an inspection task that simulated an actual task performed by parapatologists at the NCTR. This approach made it possible to obtain the objective of applied relevance and, at the same time, to establish and maintain experimental controls.

Experiment II was a field test conducted on-site at the NCTR under controlled working conditions with parapatologists as experimental subjects. The basic purpose of this experiment was to validate the findings of the two laboratory experiments. But, because the time constraint made an exact replication of the earlier experiments impossible, experiment II was necessarily a scaled-down version of the laboratory experiments. Even

with this limitation, it was felt that experiment II would provide a validation of the laboratory findings.

Variables and Task

Signal probability, defined as the ratio of signals to stimulus events, was the independent variable used to test the two hypotheses. The dependent variables or measures of inspection accuracy were the mean percent of signals detected at each level of the independent variable, and the mean percent of false reports at each level of the independent variable. A false report was defined as incorrectly reporting a nonsignal stimulus as a signal. At each level of the independent variable, the mean percent of signals detected was computed by dividing the total number (i.e., for all subjects) of signals actually detected by the total number of signals presented for inspection and multiplying by 100. The mean percent of false reports at each level of signal probability was computed by dividing the total number (i.e., for all subjects) of false reports by the total number of nonsignal stimuli presented for inspection and multiplying by 100.

The signals in both experiment I and II were microscope slides containing hyperplastic (abnormal) tissues of the transitional epithelium of the mouse urinary bladder.⁴ The stimulus events were slides of normal (nonsignal stimuli) and abnormal (signal stimuli) tissues.

The experimental task in both experiment I and experiment II required subjects to microscopically examine tissues or tissue slides. Their task in each test session was to detect the hyperplastic or abnormal tissues (the signals) contained in a set of 60 slides presented for examination. Examining tissues of the transitional epithelium of the mouse urinary bladder to detect hyperplastic tissues was chosen as the experimental task in order to closely simulate the actual NCTR inspection task, for the parapatologists routinely make this kind of examination.

Three levels of the independent variable, signal probability, were employed in experiment I. They were $p_1 = .017$ (1/60, one signal or abnormal tissue per 60 stimulus events or microscope tissue slides), $p_2 = .10$ (6/60), and $p_3 = .35$ (21/60). These particular signal probabilities were selected because they represent a broad range over which to test the effects of signal probability on inspection accuracy.

Only two levels of signal probability were employed in experiment II, .10 (p_2) and .35 (p_3). The time constraint noted earlier made it impossible to employ three levels of signal probability as in experiment I. However, as explained more fully later in the article, the results of experiment I, which was removed only one step from the NCTR operational situation, revealed that the greatest decline in inspection accuracy in terms of the percentage

⁴Hyperplasia is the overgrowth of a tissue or organ which is evidenced by an increase in the number of cell layers of the tissue or organ. When viewed under a microscope, individual cell layers show up as a series of predominantly pink and dark purple colored nuclei. Epithelium refers to the cells lining all passages of the respiratory, digestive, and urinary systems.

of signals detected occurred between the signal probabilities of .10 and .35. The assumption was made that if the percentage of signals detected decreased significantly as signal probability was reduced from the .35 level to the .10 level then it would seem reasonable to expect an even larger decrease in the percentage of signals detected if signal probability had been reduced from the .10 level to the .017 level.

Subjects and Procedure

Experiment I—Six paid volunteer subjects, all male between the ages of 23-28 years, were selected to serve as subjects in experiment I. All the subjects were graduate students majoring in zoology. In addition to their course work in zoology, each subject had taken a course in histology. The student subjects were judged overall to be a fairly homogeneous group in terms of their training and experience relevant to carrying out the experimental task. Each of the subjects participated in two intensive two-hour group training sessions prior to the experiment. The director of the NCTR Pathology Division directed the training sessions and was convinced at their conclusion that the subjects could perform the experimental task. Based on his observation of the students as they practiced the inspection task, his recommendation was that they be allowed two minutes to examine each slide during the actual experiment in order to prevent speed stress.

Each of the six subjects served in three experimental test sessions, one session at each of the three levels of signal probability. Thus, 18 independent test sessions were conducted. The subjects were tested in a counter-balanced order within the same time period.

Experiment II—Six parapatologists, as noted, were employed at the NCTR when this experiment was conducted. Based on their availability, four were chosen to participate in the experiment. The four parapatologists, two male and two female, ranged in age from 19 to 23 years. Each had been evaluating tissues at the NCTR approximately 10 months after having completed a year and six weeks training program that consisted of on-the-job training at the NCTR and classroom training at the University of Arkansas Medical Center.

Each subject served in two experimental test sessions on successive days under different levels of signal probability (p_2 and p_3). Eight independent test sessions were therefore conducted. The subjects were tested in a counter-balanced order and were all tested at the same time each day.

Apparatus

The level of magnification of the microscopes used in experiment I was held constant at 43X, while the level of magnification was held constant at 45X in experiment II. There is no reason to believe that this difference in magnification biased the results of the study.

Analysis

Treating subjects as replications, a one-factor analysis of variance (ANOVA) was performed on the data transformed to arc sines. The arcsin transformation converts percentages to normally distributed data which permits the ANOVA test to be performed independent of the assumption of normality (Kirk, 1968).

RESULTS

Experiment I

As hypothesized, the mean percent of signals or hyperplastic tissues detected decreased with reductions in signal probability. The mean percent of signals detected at each level of signal probability was: $p_3 = .350$, 92.1; $p_2 = .100$, 41.7; $p_1 = .017$, 16.7. The differences among the three probability levels for the percentages of signals detected were found to be statistically significant ($F = 10.24$; $df = 2, 15$; $p < .01$).

The second measure of inspection accuracy was the mean percent of false reports at each level of signal probability. The results are $p_1 = .017$, 18.5; $p_2 = .100$, 17.8; $p_3 = .350$, 10.2. Although the percent of false reports increased in the predicted direction, the differences at each level of signal probability failed to approach statistical significance ($F = .92$; $df = 2, 15$; $p > .05$).

Experiment II

The NCTR subjects detected almost 100 percent (98.8) of the signals at the .350 level of signal probability; yet, they detected only 75 percent of the signals at the .100 level. The ANOVA test revealed that the difference in inspection accuracy at the two signal probability levels was highly significant ($F = 35.25$; $df = 1, 6$; $p < .01$). Hence, the results of both the laboratory tests and the field test are relatively clear and consistent in indicating a positive relationship between signal probability and this measure of inspection accuracy.

As one might reasonably expect, due to the additional training and experience of the NCTR subjects, the magnitude of the decrease in inspection accuracy was not as great in experiment II as it was in experiment I. In spite of the additional training and experience of the NCTR subjects, however, the percentage of signals detected by them still varied as a function of signal probability. This suggests that additional training and experience may not be an entirely effective way of overcoming the signal probability effect. An examination of the data also suggests that the p_3 level (.35) may be approaching optimum in terms of efficient inspector performance, for the student subjects in experiment I detected 92.1 percent of the signals at the p_3 level and the NCTR subjects detected 98.8

percent of the signals at the p_3 level. Stated alternatively, efficient inspector performance on the present inspection task is expected to decrease sharply when the probability of a signal occurring is less than .35.

Whereas the percentage of false reports increased as signal probability decreased (p_3 , $\bar{X} = 4.5$; p_2 , $\bar{X} = 12.5$), the difference between the two signal probabilities for the percentage of false reports did not approach traditional levels of statistical significance ($F = 1.05$; $df = 1, 6$; $p > .05$). Nevertheless, the practical significance of the data should not be ignored. In this regard, Chapanis cautions that:

In focusing on statistical significance a laboratory experiment completely ignores the problem of practical significance. . . . The results of a laboratory experiment may tell us that we are dealing with a statistically significant effect, but they never tell us whether the effect is practically important or unimportant (1967, p. 572).

Johnson and Baker (1974, p. 298) similarly caution that "The designers and managers (of man-machine systems) must concern themselves with operational or practical significance, as well as statistically significant differences." Taking these cautionary notes into consideration, it is noteworthy that the mean percent of false reports was almost three times as great at the p_2 level ($\bar{X} = 12.5$) as at the p_3 level ($\bar{X} = 4.5$). Also, false reports tended to increase in both the previous experiments with reductions in signal probability. Therefore, in no instance did false reports decrease with reductions in signal probability. The question has to be raised then as to whether these real and consistent—but statistically non-significant—results should be ignored when designing an inspection task.

CONCLUSIONS AND IMPLICATIONS

The findings of this investigation must be viewed as tentative due to the small sample of subjects studied. The findings strongly suggest, however, that a sizeable decrement in inspection accuracy is likely to occur if an inspector is required to perform a microscopic inspection task that requires the detection of infrequently occurring signals. The decrement is most likely to be evidenced in an increased percentage of missed signals. This finding is, then, in accord with the findings of studies of simplified forms of unaided visual and monitoring inspection tasks in demonstrating that inspection accuracy is negatively influenced by low signal probabilities, which suggests that the practical relevance of these studies should not be fully discounted.

False reports increased consistently with reductions in signal probability, but the differences at each level of signal probability were not statistically significant. Mackworth (1970) and Williges (1971) have suggested that the inspector may adopt a "strict" response or decision criterion in simple monitoring tasks when signal probability is low, which results in a lower percent of signal detections as well as fewer false report errors. As a tentative explanation for the present findings, perhaps this is what occurred during the three experiments. Clearly needed are studies

that look primarily and directly at the question as to whether a specific relationship exists between missed signals and false reports with systematic changes in the inspector's decision criterion ("lax"—"strict").

The results of the study suggest that inspection accuracy increases with increases in signal probability. From this it follows, and has been demonstrated by researchers studying simple monitoring inspection tasks in the laboratory (Garvey, Taylor, & Newlin, 1959; Baker, 1960), that the possibility exists for improving inspection accuracy by introducing artificial or dummy signals into the inspection sequence. There does not appear to have been any effort outside the laboratory to introduce known signals into the inspection sequence for the purpose of manipulating the accuracy of inspectors (Wallack, 1967).

The practical implications of the artificial signals technique are several. Introducing known signals into the stream of items to be inspected would increase the signal probability and thus should increase inspection accuracy or maintain it at an acceptable level. Presumably, detection of a signal serves as reinforcement and so stimulates the inspector to continue to effectively search for signals (Deese, 1955; Jenkins, 1958; Bakan, 1959). Such a technique would also provide a means of checking inspection accuracy by comparing signals detected to those introduced. The information subsequently obtained could then be used by management to take corrective action, if necessary, in redesigning the inspection task. This information could also be provided to inspectors through feedback on how well they are performing their jobs, which has been shown to be a successful motivating technique applicable to a variety of work tasks.

The implication for the present inspection task is that the artificial signals technique appears to be a potentially effective way of insuring a high level of inspection accuracy at the NCTR. The management of the NCTR has, in fact, taken the findings of the study into account in the redesign of the parapatologists' inspection task and at last report was inserting artificial signals into the stream of slides inspected by the parapatologists to achieve an approximate signal probability of .35. Unfortunately, a "before-after" test of the realized benefits, if any, of the artificial signals technique was not possible. Testing the realized benefits of this technique in a practical setting would be a fruitful starting point for future research.

The inaccuracy of the human inspector in a variety of inspection tasks is well documented. For instance, Harris and Chaney (1969) have found through detailed job sample measures of inspection accuracy in a number of different industrial inspection tasks that seldom does a single inspector detect over 50 to 60 percent of the defects in an item at any point in time. Also, lab technicians and doctors have been found to differ considerably in their reading of X-ray films (Irvine, 1956; McKenzie, 1958). Very little, however, is known about the causes of this inaccuracy. This should be alarming, since identifying the causes of low inspection accuracy (i.e.,

those variables having negative effects on inspection accuracy) is a necessary first step in improving the accuracy of the human inspector.

Only one variable was investigated in the present study. Future laboratory and field studies should be directed toward investigating other variables that may account for the inaccuracy of the human inspector. Only through such research can the full potential of the human being as an inspector be developed.

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Errata

The top seven lines of page 625 of Michael L. Tushman's article "Technical Communication in R&D Laboratories: The Impact of Project Work Characteristics" (*Academy of Management Journal*, Vol. 21, No. 4, December, 1978, 624-645) should read:

1967; Miller, 1971; Katz and Kahn, 1966). In particular, R&D laboratories must deal with technical and market sources of uncertainty, as well as uncertainty arising from technical transfer and problem solving requirements of the larger organization (Myers and Marquis, 1969; Utterback, 1971; Kelly and Kransberg, 1975; Zaltman, Duncan, and Holbek, 1973).

If laboratories must deal with several sources of uncertainty, then a critical task of the laboratory is to facilitate the gathering, the processing,

Forecasting Teller Window Demand with Exponential Smoothing

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This paper demonstrates the use of exponential smoothing to forecast the total daily demand for teller window services in a bank. It describes (1) the procedures that were used to detect the underlying causes of systematic variation in teller window demand and (2) the use of an exponential smoothing model with seasonal factors that are not time dependent. Experimental results are presented which illustrate the improvement in forecasting performance obtained by using the nontime-dependent seasonal factors. The resulting forecasts provide a means of improving teller window staffing decisions.

Increasing labor costs are causing many banks to pay more attention to the problem of scheduling manpower efficiently. Because of the number of personnel involved, the teller window operation is frequently the first to be considered for improvements in productivity. Several problems need to be addressed in scheduling teller window operations. First, what level of demand is to be serviced? Second, how long does it take to service a particular customer? Third, how much slack capacity should be provided to meet the occasional periods of peak demand without degrading the level of customer service because of long waiting lines? Work measurement methods and queueing models have been suggested to provide a means of dealing with the latter two problems (Mornjian & Willcanis, 1971; Raedels, 1975; Rastall, 1964). However, very little work has been reported on the problem of forecasting demand for teller window services—a problem that remains a difficult one for many banks.

The problem of forecasting teller window demand can be separated into two parts: (1) predicting the total number of customers requiring teller window service on a particular day, and (2) predicting how these customers will be distributed over the course of the day. This paper is focused on the problem of predicting the total daily demand for teller window services. Its objective is to demonstrate how a relatively simple forecasting technique, exponential smoothing, can be used to provide good quality forecasts of daily teller window demand, using data provided by the Purdue National Bank of Lafayette, Indiana.

The authors begin by describing the problem of forecasting the daily demand for teller window service at one of Purdue National Bank's (PNB) eight branches—the Reserve Square branch. Special emphasis is placed on the problem of determining the systematic variations in teller window demand that occur at this branch. Next, a modified version of the exponential smoothing methodology is presented. This modification takes into account seasonal factors that are not a regular function of time. Finally, computational results are presented which illustrate the good performance produced by exponential smoothing in this application.

MEASURING TELLER WINDOW DEMAND

PNB is a medium-size retail bank with \$163 million in assets, \$11.7 million in revenues, and \$1.5 million in profits for 1974. Like most financial institutions, it is a labor intensive operation where the payroll for over 250 personnel represents the second largest expense item on the earnings statement (at 20 percent of revenues). The management of PNB recognized the existence of substantial idle time on the part of the full-time tellers, e.g., 50 percent on some days. The manpower requirements for the tellers were primarily determined by staffing to meet peak demand conditions. To reduce costs and keep good service, management considered the use of part-time tellers. However, they recognized that effective use of part timers required accurate forecasts of demand.

During the fall of 1974, PNB's management decided to collect information on actual customer traffic patterns for use in forecasting teller window demand. A review of their reporting procedures indicated that an exact count of customer traffic at the teller windows was not currently being recorded. Their processing system only collected information on the number of transaction items processed, e.g., checks, cash tickets, deposit slips, et cetera. Since actual customer arrival data is expensive to collect on a continuous basis, it was felt that it might be possible to relate teller window demand to one of the transaction items presently being counted on a routine basis.

A nine-week traffic survey was conducted at each branch to determine the actual number of customers requiring teller window service. This information was subsequently compared with the number of cash tickets processed during the same period. Cash slips were selected for two

reasons. First, these items were the only daily transactions reported by every branch. All other items lose their branch identity once they are processed through the back office operations. Second, a historical data file containing over 12 months of cash slip transaction data is maintained by the bank. A regression analysis of this data produced a coefficient of determination of $R^2 = .71$ and a correlation coefficient of .84, indicating a high degree of correlation. The equation, significant at the 95 percent confidence level, was:

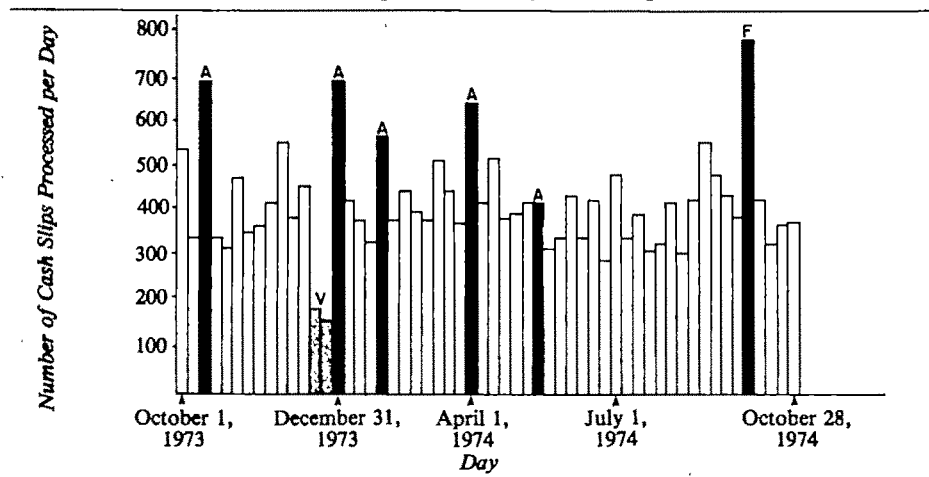
$$\hat{Y} = \text{customers} = 64.72 + 1.465 (\text{cash tickets}) \quad (1)$$

The standard deviation was 129.7 for the model.

The cash slip data were analyzed to determine whether systematic variations could be detected in the demand for teller window services at the eight branches. Substantial differences in the demand level were noted both: (1) between the days of week, and (2) between the different weeks of a month for a particular day, e.g., a Monday. Part of this variation is due to unpredictable causes such as the weather and an individual's own financial needs. However, a portion of this variation can be predicted in terms of the weekly, bi-weekly, and monthly pay periods that most organizations follow. Likewise, social security checks typically arrive around the first part of each month. Each of these events can cause a predictable increase in traffic at a branch.

A plot of the Monday cash slip data for the Reserve Square branch is shown in Figure 1. These data cover a 56-week time interval from October 1, 1973, to October 28, 1974. Note that there are substantial peaks and

FIGURE 1
Reserve Square Monday Cash Slips*



- *A = academic year payday;
- F = fiscal year payday;
- V = Christmas vacation.

valleys in the Monday time series. Five of the peak Monday demand values (represented by the solid bars) can be attributed to the payroll schedule of the major employer in the area—Purdue University. They represent the cash slip volume on the days that academic (A) and fiscal year (F) employees are paid. The dates of these paydays are known for several years into the future. In addition, the two days with the lowest cash slip volume (marked V in Figure 1) fall within the Christmas vacation period for the university. When these eight days are removed from the time series, the mean shifts from 422 to 407, and the dispersion is reduced substantially from a standard deviation value of 113 to 65.

Similar results were observed in the cash slip time series for the other days at the Reserve Square branch. For example, the Wednesday plot indicated systematic variations in teller window demand that are caused by the bi-weekly pay periods at Purdue. The determination of systematic effects on teller window demand was a critical step in this application of exponential smoothing. It resulted in a special day code, which was used to label each data point in the various time series. Four different types of days were depicted:

1. Regular days
2. Academic paydays
3. Fiscal year paydays
4. Bi-weekly paydays

In addition, four other types of days were noted which represented the day following an academic payday, a fiscal payday, or a bi-weekly payday, and a day on which *both* academic and fiscal paydays occurred. In the next section, we describe the exponential smoothing forecasting method and the manner in which this technique was modified to incorporate the influence of the special calendar days.

EXPONENTIAL SMOOTHING

Exponential smoothing offers an efficient method for computing a moving average. The simplest version of the exponential smoothing model is expressed in a single equation:

$$\tilde{S}_t = \tilde{S}_{t-1} + A (S_t - \tilde{S}_{t-1}) \quad (2)$$

where t = the time period number

\tilde{S}_t = the exponentially smoothed moving average at the end of time period t .

S_t = the actual time series value, e.g., cash slip value in time period t .

A = the exponential smoothing constant for the moving average ($0 \leq A \leq 1$).

In this study, a modified version of the exponential smoothing model described by Winters (1960) was used to forecast the teller window

demand with the cash slip data. There are two major differences. First, no appreciable trend was observed in the 56 weeks of data studied. Therefore, a trend factor was not included in the exponential smoothing model. Second, the seasonal factor adjustment described by Winters is used to model systematic fluctuations in a time series that are a regular function of time, e.g., variations of the type experienced in the demand for air conditioners or home heating oil. However, the special day factors in the cash slip data are not a *regular* function of calendar time. For example, the academic and fiscal year paydays noted in Figure 1 occur sporadically over time. Yet, these dates are known by the bank for several years into the future. Thus, a different approach was taken in incorporating the seasonal (special day) factors in the exponential smoothing model.

EXPONENTIAL SMOOTHING MODIFICATIONS

The equations used to update the forecasting model parameters, i.e., the moving average and the seasonal (special day) factors, are similar to those described by Winters. At the end of each day, after the demand (S_t) is known, the forecasting model parameters for the weighted average (\tilde{S}_t) and the special day factor representing that day (F_m) are updated:

$$\tilde{S}_t = A(S_t/F_m) + (1 - A) \tilde{S}_{t-1} \quad (3)$$

$$F_m = B(S_t/\tilde{S}_t) + (1 - B) F_m \quad (4)$$

(Where F_m = the seasonal factor for special day m , and $0 \leq B \leq 1$)

Next, a forecast of demand (in cash slips) is produced (on day t) for the k th day in the future:

$$S_{t,k} = \tilde{S}_t \cdot F_m \quad (5)$$

It is important to note that the special day factors (F_m) are used in a manner similar to that described by Chen and Winters (1966), where they are not a regular function of time (t). The special day factor (F_m) here is a multiplicative factor obtained by taking the ratio of actual demand (S_t) to the deseasonalized moving average (\tilde{S}_t) in equation (4). For example, the special day factor for an academic payday occurring on a Monday at the Reserve Square branch (Figure 1) would have a value near 1.5, reflecting the substantial increase in teller window demand on those days. This would have the effect of deflating the actual demand in updating the moving average in equation (3). Likewise, a special day factor of less than 1.0 would produce an opposite effect in equation (3).

The use of the special day factor in equations (3) through (5) requires that each point in the time series be coded with a number (m) to represent the special day factor associated with that value. For example, if a single

special day factor, representing academic paydays, were to be used with the Reserve Square Monday time series shown in Figure 1, each time series value would be coded as either a 1 or a 2. In this case, a 1 would be assigned to all of the regular days, and a 2 would be associated with each of the academic payday values. This code number performs two functions. First, it permits the correct special day factor (F_m) to be used in the calculations. Second, it provides a means of skipping equation (4) in the case of regular days. That is, a value of $F_1 = 1$ was used with the Purdue National Bank data so that the special day factor (F_1) had no effect in equations (3) and (5) on regular days, i.e., days on which no systematic demand variations were observed.

The only data needed to produce a forecast with this exponential smoothing model, using equation (5), is the current parameter value for the moving average (\bar{S}_t) and the special day factor for the type of day being forecast (F_m). Since the Purdue University paydays are known for several years in advance, long-range forecasts could be produced for the Reserve Square branch. It is also important to note that the daily updating of the exponential smoothing model parameters provides a means of incorporating gradual changes in teller window demand into the forecasting model.

SIMULATION ANALYSIS

Since each day of the week exhibited a different demand pattern at the Reserve Square branch, a separate forecasting model was developed for each day. Several models, involving the use of different types of special day factors and smoothing constant values, were tested with each time series. Simulation experiments were conducted to evaluate the performance of these models, using the standard deviation of the forecast errors as the performance criterion. The procedure for conducting the simulation experiments involved dividing each of the five time series into two parts. The first part (including approximately 22 observations) was used to estimate initial starting values for the moving average and special day factors, and the second part (including approximately 34 observations) was used to evaluate the performance of each forecasting model tested.

Three separate factors were varied in determining the best forecasting model for each day. These factors included: (a) the form of the exponential smoothing model, referred to as model type; (b) the smoothing constant value for the moving average (A) used in equation (3); and (c) the smoothing constant value for the special day factors (B) used in equation (4). A grid search procedure, similar to the one described by Winters (1960) was used to determine the best set of smoothing constant values, i.e., the set having the smallest forecast error standard deviation, for each forecasting model tested. The smoothing constant values were varied over a range from .0 to 1.0 in the grid search.

Five different exponential smoothing model types were evaluated for each time series (day). These five models involved the use of the different special day definitions shown in Table 1. For example, all paydays (academic, fiscal year, and bi-weekly) were assigned a number 2 special day code in model 3. Since some carry-over in teller window demand frequently occurs on the day following a payday, such days were assigned a number 3 special day code in this model. The remaining days in the time series were referred to as regular days and assigned a number 1 special day code. The other models shown in Table 1 involve similar groupings of the various types of days observed in each time series.

TABLE 1
Exponential Smoothing Models

<i>Model</i>	<i>Day Code</i>	<i>Day Code Description</i>
1	1	All days
2	1	Regular days
	2	Paydays
3	1	Regular days
	2	Paydays
	3	Day following a payday
4	1	Regular days
	2	Academic paydays
	3	Fiscal year paydays
	4	Days on which both an academic and fiscal year payday occurred
	5	Day following an academic payday
	6	Day following a fiscal year payday
	7	Days which followed a fiscal year payday and which occurred on an academic payday
5	1	Regular days
	2	Academic paydays
	3	Fiscal year paydays
	4	Days on which both an academic and fiscal year payday occurred
	5	Day following an academic payday
	6	Day following a fiscal year payday
	7	Days which followed a fiscal year payday and which occurred on an academic payday
	8	Every second Wednesday to reflect a bi-weekly pay pattern present

COMPUTATIONAL RESULTS

The simulation experiments were designed to test the notion that systematic variations in teller window demand can be identified and introduced into the exponential smoothing model to improve forecasting performance. The experimental results, shown in Table 2, indicate the forecast error standard deviation (σ_e) produced by the best set of smoothing constant values (A and B) found for each model and time series (day) combination tested. The degree of improvement provided by the addition of the different special day factors to the forecasting model is indicated by a comparison of the forecast error standard deviation values within each column. When the simple exponential smoothing model (equation 2) is used with each time series (model 1 in Table 2), large

TABLE 2
Experimental Results: Forecast Error Standard
Deviation and Smoothing Constant Values

<i>Model</i>	<i>Monday</i>	<i>Tuesday</i>	<i>Wednesday</i>	<i>Thursday</i>	<i>Friday</i>
1	102.2 ^a (A = .1, B = 0) ^b	144.8 (A = .1, B = 0)	160.0 (A = .1, B = 0)	76.0 (A = .3, B = 0)	166.2 (A = .1, B = 0)
2	93.0 (A = .1, B = .1)	97.9 (A = .1, B = .2)	94.1 (A = .1, B = .1)	71.5 (A = .4, B = .1)	83.3 (A = .2, B = .1)
3	83.3 (A = .1, B = .1)	60.7 (A = .2, B = .1)	79.2 (A = .1, B = .1)	66.1 (A = .4, B = .1)	81.8 (A = .1, B = .1)
4	65.3 (A = .2, B = .1)	57.5 (A = .3, B = .1)	79.3 (A = .1, B = .2)	61.2 (A = .3, B = .1)	61.1 (A = .1, B = .1)
5	—	—	67.3 (A = .1, B = .2)	—	—

^aRepresents the forecast error standard deviation produced by the best set of smoothing constant values (A and B) for each model type and time series (day) combination tested.

^bThe smoothing constants that produced the lowest forecast error standard deviation.

forecast errors are encountered—mainly because of the impact of payday demand. However, the gradual introduction of the special day factors produced a marked decrease in the forecast error standard deviation values shown in Table 2. A comparison of the forecast error variance for model 1 and model 4 (model 5 in the case of Wednesday) indicates that this reduction is significant at the .01 level of significance (except for Thursday) using an *F*-test.

The forecasting results shown in Table 2 also reflect the important impact that changes in smoothing constant values can have on forecasting performance. The best smoothing constant values observed in these experiments were rather small, ranging from .1 to .4. This suggests that the moving average and special day factor values are rather stable for the PNB Reserve Square branch. Larger smoothing constant values tested in these simulation experiments produced much larger forecast error standard deviations (e.g., 135 for A = .9 in the case of model 1 for the Monday time series).

CONCLUSIONS

This application of exponential smoothing demonstrates two points. First, systematic causes of teller window demand can be identified and exploited to improve forecasting performance. Often, these sources of variation are well-known to bank officers. For example, four of PNB's eight branch offices are located near large and dominant employers in the Lafayette area. Thus, knowing their payday schedules allows management to anticipate teller window demand changes. Also, the remaining four branches tend to follow regular patterns, because of the similarity in payroll policies for the local employers, businesses, and residents. These common pay periods occur at mid-month and month-end and also involve the distribution of social security checks around the third day of the

month. Management is generally aware of the impact of these events on teller window demand and has, in the past, used this information in an intuitive manner in making staffing decisions.

Second, this application illustrates how systematic causes of variation can be measured in a quantitative fashion and used in conjunction with a statistical forecasting technique, thereby reducing the time and effort required to develop demand forecasts. Keeping the manhour requirements to a minimum provides management with a more effective planning tool, since forecasts can be made cheaply and routinely, while the updating of parameter values occurs when changes in demand take place. These forecasts are critical, since effective use of personnel requires the use of the best available demand estimates. If poor estimates are present, then only poor staffing decisions can result.

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How American Executives Disagree about the Risks of Investing in Eastern Europe

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A survey of 120 U.S. firms indicated substantial East-West trade activity. However, almost no joint ventures between U.S. firms and Eastern European enterprises were found. There seemed to be a strong negative attitude among U.S. executives with regard to joint ventures with Eastern Europe. This negative attitude was partitioned into two parts, that dealing with the executives' perception of political risk and that associated with the belief that more managerial time is required to supervise ventures in Eastern Europe. Executives knowledgeable about Eastern Europe show more concern for the latter aspect, while those less familiar with Eastern Europe are more likely to worry about the political risks.

A basic theme of business policy is that a corporation should choose a niche congruent with its distinctive competencies. The challenge of environmental scanning is to restructure that niche as the environment evolves (Aguilar, 1967). In order to develop a generalizable model of how corporations respond to a changing environment, it is necessary to study a situation where a stimulus affects many corporations. The imposition of a new government constraint is one such stimulus, since it affects all corporations and the firm's environmental scanning apparatus need be no more subtle than their own law department. However, because most executives vituperate against new restraints, attitudinal questionnaires of such situations uncover few surprises.

Another condition for studying executive response to an evolving environment occurs when the government removes a restraint. Recently,

governments have lifted restrictions on U.S. corporations doing business in some Eastern European nations. The opportunity presented by this generalized shift in the environment calls for more subtle environmental scanning and analysis than the placement of a constraint since there is no direct impetus to evoke a joint venture in Eastern Europe as an alternative (March & Simon, p. 53). Moreover, the changes in lifting the constraints have occurred gradually. For example, the NATO trade embargo list of Eastern Europe was shortened in 1960 to include only items of *direct* strategic importance. Likewise, in the U.S., the restrictive Export Control Act of 1949 was replaced in 1969 by the Export Administration Act, embodying a more open orientation toward American-Eastern European trade. This legislation was broadened by the Equal Export Opportunity Act of 1972.

As a result of this changing environment, U.S. firms have altered their portfolio of business ventures, as witnessed by the sharp increase in trade between American corporations and Eastern European enterprises. In addition to trade, both sides have increased their involvement in other more complex forms of exchange such as technical assistance, licensing and turnkey agreements.

Using Braybrooke and Lindblom's (1963) concept of "muddling through," we would expect joint ventures to be the next logical step in this progression of exchange. This is especially true since many Eastern European countries have modified their laws to encourage East-West joint ventures. Yugoslavia was the first to amend its foreign investment law, first limiting foreign involvement to 49 percent and later relaxing this restriction so that now a Western firm can have majority participation for selected contracts: (Article 4, paragraph 2 of the 1973 Yugoslav Investment Law provides that if the Federal Assembly determines that special circumstances in a particular economic activity are present, a foreign investor's equity share in a joint venture might exceed 49 percent.) Romania also passed legislation and actively campaigned to attract foreign investors. Hungary followed suit in late 1972 (McMillan, 1974). In 1976, Poland established the formal legal framework for both coproduction agreements (using a Polish enterprise as a long-term source of supply) and equity joint ventures (which have a residual value if terminated).

Based upon the success of other types of exchange between East and West, it might be expected that the Eastern Europeans' new stance would result in a number of joint ventures between East and West. However, the response has been almost negligible. For example, the results of our comprehensive survey of U.S. firms (the details of which will be described shortly) indicate that although 61 percent of a random sample of firms were engaged in some type of export-import business with the Eastern European bloc, only 3 percent had any joint ventures with firms within these countries. (In comparison, 58 percent of the same group of firms reported having at least one joint venture in other countries outside the U.S.)

Similarly, little executive interest in Eastern Europe as a joint venture site was found. The authors asked a series of questions pertaining to the executives' interests in specific types of joint international business activities in and out of Eastern Europe. When the question referred to interest in Eastern Europe, joint ventures scored a distant fourth to exports-imports, licensing and technical assistance. In comparison, when asked about interests outside Eastern Europe, the executives were much more positive toward joint ventures, again ranking them below importing-exporting but almost identical to licensing and considerably above technical assistance. Based upon these data, it seems that U.S. executives perceive that there is something inherently different about joint ventures in Eastern Europe versus other areas of the world. The question then becomes, "Why?"

RESEARCH DESIGN

Before designing a questionnaire, the authors conducted in-depth interviews with several U.S. international executives. Those with a significant amount of experience tended to perceive differences between each nation in Eastern Europe. However, even this group of sophisticated executives tended to discuss these nations as a group. Therefore, in designing the questionnaire, it was decided not to treat each Eastern European country separately, since any attempt to focus on specific countries would have considerably complicated the questionnaire and lengthened the respondent's task (and consequently adversely affected the response rate). As a result, the analysis applied to Eastern Europe in general. (One analysis which looked at specific countries was reported by Brada (1976), who was concerned with differences in accounting definitions and tax structures in individual Eastern European countries and their impact on the host country's share of the benefits of joint ventures. His study, however, does not look at U.S. experience or perceptions of these differences.)

A questionnaire was sent to the VP-international of 521 American corporations. Since the authors were particularly interested in obtaining opinions of executives who had business experience with Eastern European firms, this segment was over-sampled by selecting all 107 corporations mentioned in Business International's *Eastern European Report* as doing business in Eastern Europe. Another 414 firms were selected randomly from the Standard & Poor's Index. Thirty-four of the 107 specifically-selected firms and 86 of the 414 randomly selected firms returned useable responses yielding an overall response of 120 or 23 percent.

As one would expect, corporations involved in Eastern Europe were more likely to respond. Of the 107 corporations identified through *Eastern European Report*, 32 percent responded, as compared to 21 percent from the random sample. As a result, sample averages based on the 120 responses are biased, since the sample has a higher proportion of

executives with interests in Eastern Europe than the population at large. Consequently, the subsequent analyses sample means are not reported for the particular questions. Instead, a model of the investment decision is constructed and then the parameters for this model are estimated from the sample data. These estimates have a smaller variance than ones based on a random sample since the sample had a disproportionate number of very involved executives (as well as many executives who weren't involved).

The questionnaire was designed to determine the corporation's business activities outside the United States and, in particular, its involvement in Eastern Europe. The questionnaire included items to determine the executives' perceptions of factors which might prevent a corporation from entering into an international joint venture, and a description of how the firm screens potential joint ventures. Finally, specific information on firm size, competitive environment, et cetera, was obtained. The questionnaire items used in the analyses discussed here are given in Table 1. In all, the questionnaire took the respondents about 30 minutes to complete.

TABLE 1
Wording and Coding of Questions Used in Analysis

Information Level—How informed do you keep yourself with the new economic developments in the Eastern European countries? (5 point scale from very informed to not informed).

Involvement in Eastern Europe—What types of international activities is your company involved in? Please check as many as appropriate.

Return—Please consider two potential joint ventures: one in a noncommunist country, the other in an Eastern European country. Assume that the economics of the two countries are identical and only their political systems are different.

The venture in this noncommunist country yields 20 percent return on investment after taxes. All other technical and economic factors being equal, how much return would the Eastern European joint venture have to yield in order to make you see the two ventures as equally attractive? (19-point scale from 12 percent or less to 30 percent or more)

Perceptions of Expropriation Risks—Consider the following statement. The communist regime of a country has the connotation of instability and is associated with a high risk of nationalization-expropriation (6-point scale from strongly agree to strongly disagree).

Established Communist Regime—How important do you consider an established communist regime like the ones in Eastern Europe in preventing you from accepting any potential international joint ventures (5-point scale from very important to not important).

Perceptions of Hindering Factors—Which are, in your opinion, the most important factors hindering the American-Eastern European economic cooperation?

Inconvenience—Some prospects appear attractive on the books, but they may be troublesome and consequently consume excessive amounts of the time of corporate officers. If your company is doing any type of business in Eastern European countries, please tell us how this business compares to your other operations (6-point scale from much more trouble to much less trouble).

MODEL OF INVESTMENT DECISION FOR JOINT VENTURES

Before looking at the problem of joint ventures in Eastern Europe, it is important to identify those factors which influence U.S. firms to engage in a joint venture outside the U.S. This is done by means of a descriptive model of how U.S. firms make a joint venture investment decision.

Joint ventures can be viewed as an exchange of resources between two parties. It is often possible to characterize these parties as a buyer and seller. As was noted earlier, the data indicated that many of the U.S. firms

are actively involved (or at least have some interest) in joint ventures. The research question then becomes, "Do the U.S. or foreign firms initiate the exchange?", i.e., are U.S. firms active sellers or reluctant buyers? Of the 107 foreign joint ventures in the sample (almost all of which were outside Eastern Europe), only 32 percent were triggered by a specific corporate strategy to search for a joint venture. Moreover, almost 80 percent of the firms considered only one country when evaluating the foreign joint venture. This indicates that U.S. firms tend to be reluctant buyers in joint ventures and that the firms, instead of actively seeking or creating a number of alternatives, judge joint ventures as they are presented, deciding sequentially on whether or not to enter into the relationship.

The hypothesis that U.S. firms are reluctant buyers is further supported in that only 11 percent of the foreign joint venture ideas presented to corporate management were consummated. In fact, the respondents report that approximately 50 percent of the proposals were screened out after only mail correspondence, given more credence to the idea that U.S. firms conduct cursory analyses for most joint venture projects.

From the above data, it appears that (a) most U.S. firms do not actively seek out joint ventures and (b) that most projects are given only a cursory analysis. Moreover, based on the few existing joint ventures in Eastern Europe there seems to be a greater tendency to screen out projects in Eastern Europe than in other areas. With this in mind, let us explore how joint ventures in Eastern Europe could be made more attractive to U.S. businessmen.

It appeared initially that as executives gained increased knowledge about the economic and political environment in Eastern Europe they would be more likely to get involved in joint ventures with Eastern European firms. This feeling was based on the premise that the more knowledgeable executives would not have to compensate for their uncertainty by requiring the venture to yield very high potential rates of return. In other words, the hypothesis was that increased knowledge would reduce the executive's perceived probability of a negative event and consequently decrease his or her perception of the risk associated with the project. In Bayesian terminology this change in the executive's prior knowledge increases the project's expected return and consequently the probability that this rate exceeds the hurdle rate of return. The logical extension of this hypothesis was that the knowledgeable executive would have more interest in Eastern European ventures. This implication is explored in the next section.

Knowledge and Rate of Return

Two measures which estimated the executive's knowledge about Eastern European countries were constructed. The first was based on the executive's self-reported perception of how informed he kept himself on new economic developments in Eastern European countries. This measure is

called the INFORMATION LEVEL. (All the variables which will be used in the analysis have been capitalized. The wording of the questions is given in Table 1.) A second knowledge measure rests on the assumption that people learn by doing, i.e., that involvement gives real information. Respondents were asked what types of Eastern European activities they were involved in. Affirmative answers to each of eight forms of international business (export-import, licensing, technical assistance, turnkey operation, management contracts, minority/majority joint ventures, and wholly owned subsidiaries) were given differential weights to reflect prior beliefs about the degree of involvement associated with each type of activity. These weights were one for export-import, two for licensing, technical assistance, turnkey operations and management contracts, and three for minority/majority joint ventures. These results were then summed yielding the measure INVOLVEMENT IN EASTERN EUROPE.

The next step was to measure the American executives' perceptions with respect to the necessary rate of RETURN for a project. This was done by asking the executives to consider two potential joint ventures which differed only in that one was located in a noncommunist country and the other was located in an Eastern European country. They were then asked how much return the Eastern European joint venture would have to yield (relative to the other venture) to make the ventures equally attractive. Rates which exceeded the noncommunist country venture's rate are interpreted to reflect executives' adverse feelings towards joint ventures in Eastern Europe, while lower rates are interpreted conversely.

The hypothesis was that increased knowledge would lead to lower required rates of return. This hypothesis was tested by running three simple regressions. In each case, RETURN was used as the dependent measure, while the independent measures were respectively INFORMATION LEVEL, INVOLVEMENT IN EASTERN EUROPE and the summation of these two variables which is called KNOWLEDGE INDEX. For each analysis, the association between the particular knowledge measure and the rates of return measure was statistically insignificant. Since these results were counter to the hypothesis, the basic model of investment behavior had to be rethought. As a result, two new hypotheses which more explicitly stated why the authors felt that rate of return should be related to knowledge were generated.

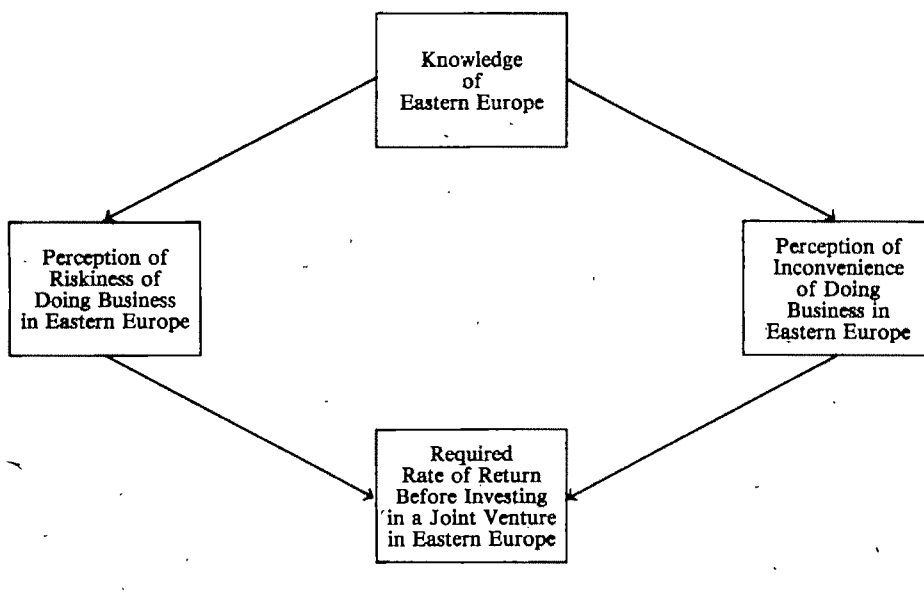
The first hypothesis is that unknowledgeable executives, conditioned to react to communism, perceive disproportionate political risks in doing business in Eastern Europe. This perception of risk requires higher rates of return than if the project was located outside Eastern Europe. Conversely, executives who were more knowledgeable about Eastern Europe perceive lower political risks and thus require lower rates of return. The data (still to be presented) are compatible with these statements.

The second hypothesis was that more knowledgeable executives, knowing how to find their way through the bureaucracies of Eastern Europe, perceive less inconvenience or trouble in doing business in Eastern Europe

than the less knowledgeable executives. Inconvenience is operationally defined in terms of red tape, waste of management time, et cetera. However, as will be soon shown, the expected negative relationship between knowledge and inconvenience did not materialize. In fact, the relationship (which satisfies stringent tests of significance) was found to be quite positive, implying that more knowledge leads to greater awareness of inconvenience.

In summary, it was hypothesized that more knowledgeable executives would perceive less risk, and hence would tolerate a lower rate of return. It was erroneously conjectured that more knowledgeable executives would perceive less inconvenience than less informed executives, and hence would once again tolerate a lower rate of return. The causal interdependence between KNOWLEDGE, RISK, INCONVENIENCE (the actual method for measuring these variables is explained in the next sections), and RETURN, is displayed in Figure 1. In terms of this diagram, it was originally conjectured that the two pathways from knowledge to return would be mutually reinforcing. Based upon the empirical findings, they appear to oppose one another, yielding an explanation of why almost zero relationship between KNOWLEDGE and RETURN was found. In the following sections the magnitude and directions of the relationships expressed in Figure 1 are explored.

FIGURE 1
Flow of Effect of Knowledge on Interest in Investing in
a Joint Venture in Eastern Europe



Measuring the Perceived Risk Level

Three questions were used to measure different aspects of the risk unique to doing business in Eastern Europe. In each case these questions attempted to measure the executives' perceptions of risk versus actual levels.

The measures were based upon (a) the executives' perceptions about the degree to which a communist regime is associated with instability and a high risk of expropriation (PERCEPTION OF EXPROPRIATION RISKS), (b) how important an established communist regime was in preventing the executive from accepting any potential international joint venture (ESTABLISHED COMMUNIST REGIME) and (c) unaided responses to a question on factors hindering American-Eastern European economic cooperation. In this latter question, some respondents emphasized factors such as fear of nationalization-expropriation, reluctance to divulge latest technology, changeable government policies, *et cetera*. These types of comments were interpreted to indicate that the respondents perceived political risk as a key element in hindering the East-West business cooperation. Each respondent's PERCEPTION OF HINDERING FACTORS is a count of the number of times political risk, or risk-related factors, were mentioned.

As with the measures of knowledge these three measures were analyzed separately and also in the aggregate, the latter being formed by simply taking the sum

$$\begin{aligned} \text{RISK} = & \text{PERCEPTION OF EXPROPRIATION RISK} \\ & + \text{ESTABLISHED COMMUNIST REGIME} \\ & + \text{PERCEPTION OF HINDERING FACTORS} \end{aligned}$$

As with the three individual scores, high RISK scores indicate a high level of perceived risk.

The Effect of Knowledge in Reducing Perceived Risk

As a first step in analyzing how knowledge and perceived risk interrelate, each knowledge level measure was correlated with each perceived risk measure. Both the correlation coefficients and their levels of significance are presented in Table 2 for the total sample. Column-by-column, the correlation coefficients in Table 2 lead to the following conclusions:

- (1) The more knowledge about Eastern European countries the American Executive has, the less political instability and risk of expropriation he perceives in those countries.
- (2) The more knowledge about Eastern Europe the American executive has, the less a communist regime like the ones in Eastern European

countries tends to prevent him from accepting a potential international joint venture.

- (3) The more knowledge about Eastern European countries the American executive has, the less often he mentions political risk as an obstacle hindering American-Eastern European economic cooperation.

TABLE 2
Correlation Coefficients Between Level of Information and Perceived Risk

	<i>Perception of Expropriation Risk</i>	<i>Established Communist Regime as Obstacle</i>	<i>Perception of Hindering Factors</i>
Information Level	-0.3227 .001*	-0.2798 .002	-0.1400 .064
Involvement in Eastern Europe	-0.2907 .071	-0.4257 .001	-0.1317 .076
Knowledge Index	-0.3659 .001	-0.4153 .001	-0.1621 .039

*Denotes level of significance.

It should be noted that significant correlations do not insure the existence of a causal relationship between knowledge and perception of risk as shown in Figure 1. In fact, there may be a reverse effect between these two variables, i.e., lower perceived risk may generate more involvement or desire to keep abreast with Eastern European developments. However, it is clear that the relationship is statistically significant; perhaps the best single measure of this association is the $-.50$ correlation between the overall risk measure (RISK) and the summary knowledge measure (KNOWLEDGE INDEX) which is significant at the .001 level.

The Effect of KNOWLEDGE on the Amount of Perceived INCONVENIENCE

The amount of INCONVENIENCE American executives perceive in doing business in Eastern Europe was measured by asking whether or not it takes more time to manage projects associated with Eastern European countries. The relationships between the three knowledge measures and the perceived inconvenience measure are presented in Table 3. Each knowledge variable has a significant and positive correlation with INCONVENIENCE, indicating that increased knowledge is associated with a belief that doing business with Eastern European countries is more trouble. The converse is that inexperienced executives fail to realize how much they will have to adapt. This fits with a view that inexperienced executives may well be ethnocentric (Rutenberg, 1970).

TABLE 3
Correlation Coefficients Between Knowledge and Inconvenience

	<i>Inconvenience</i>
Information Level	0.2846
Involvement in Eastern Europe	.003 ^a
Knowledge Index	0.2847
	.003
	0.3482
	.001

^aDenotes level of significance.

Model of the Determinants of Required Rate of Return¹

Thus far the relationship between KNOWLEDGE, RISK, AND INCONVENIENCE has been explored by looking at pairs of variables. However, Figure 1 displays a specific system of relationships (paths) between the variables. We solve for the parameters of this system as follows. Define $X_{1,i}^*$ to be the i^{th} executive's true knowledge level of conditions in Eastern Europe. Likewise, let $X_{2,i}^*$ be the i^{th} executive's true feelings of political risk, and $X_{3,i}^*$ be his true feelings of inconvenience. Finally, let $X_{4,i}^*$ be his true required rate of return for a joint venture in Eastern Europe. We then make the convenient but nonrestrictive assumption that each of these variables are standardized, i.e., come from a population with a zero mean and variance equal to one. Then the path relationship of Figure 1 can be written as follows:

$$X_{2,i}^* = b_2 X_{1,i}^* + \epsilon_{2,i}, \quad (1)$$

$$X_{3,i}^* = b_3 X_{1,i}^* + \epsilon_{3,i}, \quad (2)$$

$$X_{4,i}^* = c_2 X_{2,i}^* + c_3 X_{3,i}^* + \epsilon_{4,i}, \quad (3)$$

where $\epsilon_{j,i}$, $j = 2, 3, 4$, represents an error term. Equations (1), (2), and (3), represent "truth," i.e., our model of how the variables interrelate. Unfortunately, $X_{j,i}^*$, $j = 1, 2, 3, 4$ is not observed. Instead, a fallible measure of the executive's true feelings of variable j , $j = 1, 2, 3, 4$ is obtained. Denote these observed (measured) variables as $X_{j,i}$ (i.e., without the star). It is then hypothesized:

$$X_{j,i} = X_{j,i}^* + u_{j,i}, \quad j = 1, 2, 3, 4, \quad (4)$$

where $E(u_{j,i}) = 0$. Equation (4) says that the measures of the constructs knowledge, risk, et cetera are fallible, but unbiased (i.e., they have no tendency to over or underpredict).

¹The general methodology for this section is based on work reported in Kadane, McGuire, Sanday & Staelin (1976).

In summary, equations (1)-(3) summarize how the true variables interrelate and equation (4) acknowledges that these true variables were measured with error.

Since the true variables are not observed, we must substitute equation (4) into equations (1), (2) and (3) to get rid of the unobserved variables $X_{j,i}^*$, $j = 1, 2, 3, 4$. After doing this, the equations are:

$$X_{2,i} = b_2 X_{1,i} + \epsilon_{2,i} + u_{2,i} - b_2 u_{1,i}, \quad (5)$$

$$X_{3,i} = b_3 X_{1,i} + \epsilon_{3,i} + u_{3,i} - b_3 u_{1,i}, \quad (6)$$

$$X_{4,i} = c_2 X_{2,i} + c_3 X_{3,i} + \epsilon_{4,i} + u_{4,i} - c_2 u_{2,i} - c_3 u_{3,i}. \quad (7)$$

The equations (5) through (7) are related via their error terms, since the error term $u_{1,i}$ appears in equations (5) and (6) and $u_{3,i}$ appears in equations (6) and (7). A system of equations which is linked via the error terms is often referred to as seemingly unrelated regressions (Zellner, 1962). Also of interest in terms of estimation is the occurrence of the endogenous elements $X_{2,i}$ and $X_{3,i}$ on the right side of equation (7) since these elements are not independent of the error structure. Consequently, in order to avoid biased estimates, this dependency must be taken into account during the estimation process (Johnston, 1972). The actual estimation procedure used was originally proposed by Zellner and Theil (1962) and is known as three-stage least squares. It yielded the following results:

$$\hat{b}_2 = .50, \hat{b}_3 = .36, \hat{c}_2 = .41, \text{ and } \hat{c}_3 = .13.$$

The estimate for the coefficient $\hat{b}_2 (= -.50)$ in equation (5) means that increased knowledge leads to a lower perception of political risk. Likewise, $\hat{b}_3 (= .36)$ implies increased knowledge causes a higher perception of inconvenience. The parameter estimate $\hat{c}_2 (= .41)$ means that the required rate of return is increased when the executive perceives an increase in political risk, while $\hat{c}_3 (= .13)$ indicates that higher levels of perceived inconvenience of dealing with Eastern Europe require the higher rates of return. Because $\hat{c}_2 (= .41)$ is greater than $\hat{c}_3 (= .13)$ and the variables were first normalized, it can be concluded that in the eyes of U.S. executives, political risk has a greater effect than inconvenience.

INVESTING IN EASTERN EUROPE VERSUS NONCOMMUNIST COUNTRIES

The above analysis has been concerned with business activities within Eastern Europe. Since political risk is a substantial deterrent in the investment decision, a logical extension of the analysis is to determine those factors which lead to a high perception of political risk regardless of the identity of the country. Political risk was divided into three components:

political instability in general, threat of a communist takeover, and the presence of an established communist regime. Respondents were asked to evaluate how important they considered each of these components when evaluating a potential international joint venture. The distribution of actual responses, as well as mean values, is shown in Table 4. (The reader should remember that these distributions are based on the total sample which has a disproportionate number of executives who have experience in business dealings with Eastern Europe.)

TABLE 4
Inhibitors of Foreign Investment Distribution of Responses

<i>Inhibitors</i>	<i>Very Important</i>			<i>Not Important</i>		<i>Mean Score</i>	<i>Sample Size</i>
	<i>5</i>	<i>4</i>	<i>3</i>	<i>2</i>	<i>1</i>		
Political instability in general	56	29	15	3	3	4.2	106
A threat of a communist takeover	41	27	24	8	4	4.0	104
An established communist regime	16	21	40	18	9	3.2	104

The results indicate that political instability and the threat of a communist takeover are the strongest inhibitors of foreign investment. Furthermore, they indicate, rather surprisingly, that a threat of communist takeover is perceived by our American executives as somewhat more acceptable than some *unknown* political change (mean response values of 4.0 versus 4.2). Thus it appears that American investors perceive Eastern European countries as at least as good a place to invest as unstable non-communist nations in terms of political risk. These findings imply that U.S. corporations may be tightening their screening of investments in such countries as Italy, Chile, and South Africa.

CONCLUSIONS

The motivation behind the preceding analyses (and the entire survey study on American-Eastern European joint ventures) was to help bridge the understanding and cooperation gap between American corporations and Eastern European enterprises.

Substantial East-West trade activity was noted. However, almost no joint ventures between these two parties were found. This condition exists in part because U.S. firms screen out most foreign joint ventures without detailed analysis regardless of the country of their origin. Also, there seems to exist a strong negative attitude among U.S. executives with respect to joint ventures with Eastern Europe. This negative attitude was partitioned into two parts, that dealing with the executive's perception of

political risk and that associated with the belief that more managerial time is required to supervise ventures in Eastern Europe.

The data indicate a relationship between knowledge of Eastern European conditions and the two components of the above mentioned negative attitude as follows. Inexperienced U.S. international executives tend to believe that there exists a greater risk in investing in Eastern Europe. But, they tend to down-play the amount of red tape, waste of management time, et cetera, associated with these ventures. Originally it was anticipated that increasing knowledge levels within U.S. firms would lead to more co-production agreements between the two parties. Perhaps it will since the more knowledgeable executives do perceive less political risks in Eastern Europe. However, while learning more about Eastern Europe (and thus lowering their perception of risk), the American executives are more likely to have their eyes opened to the inconveniences of doing business with Eastern European enterprises. For example, interviews with U.S. Embassy personnel in Romania, Hungary and Poland indicate that many U.S. businessmen still fly in to make a quick deal, then become disillusioned because of the complications imposed by governments. The fact that some joint venture agreements have been signed shows the tenacity of U.S. executives and also enterprise managers. Both have persevered.

There is some indication that executives are not as wary of a communist regime as they are of political unrest in general, be it due to a leftist or rightist movement. Consequently, all other things being equal, it is to be expected that U.S. firms are less likely to engage in joint ventures in countries with an unstable political environment than a stable communist government. Based on this finding, the authors project a cautiously optimistic forecast for future joint ventures in Eastern Europe.

Finally, the results provide some additional insights to the concept of strategic scanning. Aguilar (1967) attempted to extend his field observations to prescribe the building of a scanning organization; he did not fully succeed. This research highlights the executives' concerns about risk and implies that since scanning to alleviate anxiety about risk calls for a quite special organizational design, one should not expect a large immediate increase in joint ventures.

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Research Notes

AN EXPLORATORY STUDY OF THE UTILIZATION OF ASSESSMENT CENTER RESULTS¹

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Assessment centers were originally used almost exclusively to make promotional decisions. While this probably continues to be the most common use of assessment centers, other potential uses are being advanced in the literature. Byham (1971) suggests that specific developmental recommendations can be made to the assessee based on the strengths and weaknesses identified by the assessment center exercises. Finkle and Jones (1970) suggest that assessment center results can be used for (1) planning replacements or backups to managerial positions, (2) identifying potential managers in different departments of the organization, (3) determining overall organizational strengths and weaknesses, and (4) assisting in a variety of management development efforts. Bray (1971) argues that assessment centers can be used to identify minority group members who have good potential to move into managerial jobs. Recently, some organizations have started using them to aid employees in career planning. Finally, Byham (1971) and Kraut (1972) stress that higher level managers, who serve as assessors, benefit a great deal from the formal training they receive as well as the actual experience of assessing participants.

While the literature on assessment centers is extensive, the empirical research has focused on their validity in making promotional decisions. Validity studies at American Telephone & Telegraph (Bray, Campbell, & Grant, 1974), General Electric (Meyer, 1972), International Business Machines (Dodd, 1970), Sears (Bentz, 1967), Standard Oil of Ohio (Carleton, 1970) and other organizations show that assessment center ratings are valid predictors of subsequent performance in managerial positions. Since only one known empirical study (Bender, 1973) has looked beyond the validity issue, this exploratory study seeks to do so by determining how organizations actually utilize assessment center results.

¹A debt of gratitude is owed to William Byham, President of Development Dimensions, Inc., Pittsburgh, Pennsylvania, for granting access to his client firms which participated in this study. Special thanks is also due Anthony Raia of the University of California, Los Angeles for his insightful comments and suggestions on this paper.

Research Questions

The three specific research questions which provide the focus for this study are as follows:

RQ1—Which administrative practices do organizations generally adopt in their follow-up efforts with assessees?

RQ2—How much weight do organizations give assessment center results for various uses suggested in the literature?

RQ3—What is the relative importance given to assessment center evaluations in comparison with other promotional criteria.

Method

Questionnaires were mailed to 100 organizations throughout the United States now using assessment centers. This sample was randomly selected from a published list of about 200 major clients that had help from Development Dimensions, Inc. in setting up their assessment center programs. This consulting firm has worked with the majority of over 1,100 estimated organizations (Linkoff, 1978) now using assessment centers. Instructions indicated that the questionnaire should be completed by someone from the assessment center staff who was in a good position to know how the program was being used throughout the organization. Respondents were asked to (1) provide general background information, (2) indicate which of 15 different administrative practices they followed, (3) rate 10 different uses of assessment center results according to their actual ("actually is now") and ideal ("ideally should be") utilization, using a seven-point Likert response scale, and (4) rank six promotional criteria, including assessment center evaluations, in order of importance for promotion to the first level of management.

Results and Discussion

The 65 organizations which returned a usable questionnaire varied considerably according to size, industry, and geographical location. For the sample group as a whole, the average organization had assessed 110 people during a median program life of 2.5 years. Furthermore, the median length of the assessment center exercises was 16 hours, which represents two full days of assessment.

Administrative practices are important to consider because they spell out the policies and procedures to be followed by the organizations in utilizing assessment center results. Responses to the various administrative practices were classified according to the percentage falling into the "yes," "sometimes," and "no" categories. Table 1 lists the 15 administrative practices in descending order of utilization according to the percent falling in the "yes" response category. Only five administrative practices are strictly followed by the majority of the 65 responding



TABLE 1
Administrative Practices Followed in Processing Assessment Center Results

	<i>Percentages</i>		
	<i>Yes</i>	<i>Sometimes</i>	<i>No</i>
1. Oral feedback is given to the assessee	97	3	—
2. Written evaluations are prepared on each assessee	92	3	5
3. Feedback is given by the assessment center staff	81	8	11
4. Specific developmental recommendations are given in the feedback	65	26	9
5. Evaluations are made available to higher management	57	26	17
6. Immediate supervisor is asked to coach employee on improving weaknesses	49	25	26
7. Assessee's immediate supervisor gets feedback of the evaluation	48	23	29
8. Assessee gets a written summary of his performance	48	4	48
9. Assessee's training and development needs are discussed with supervisor	45	33	22
10. Career plans of the assessee are discussed in feedback process	45	27	28
11. Employees who did poorly can be reassessed later on	42	12	46
12. Assessee is told whether or not he has good potential for advancement	40	25	35
13. Developmental plan is initiated as a result of participation in program	36	33	31
14. Assessment center staff monitors subsequent development of assessee	34	24	42
15. Evaluation becomes a part of the employee's personnel file	18	5	77

organizations. Furthermore, four of these concern the immediate feedback of the results to the assessee: (1) oral feedback is given to the assessee by 97 percent, (2) written evaluations are prepared on each assessee by 92 percent, (3) feedback is given by the assessment center staff by 81 percent, and (4) specific developmental recommendations are given in the feedback by 65 percent. Conversely, fewer organizations tend to follow administrative practices which concern the subsequent utilization of the results. Evaluations are made available to higher management by 57 percent; the immediate supervisor is asked to coach employee on improving weaknesses by 49 percent; the assessee's training and development needs are discussed with his supervisor by 45 percent; the career plans of the assessee are discussed in the feedback process by 45 percent; the assessee is told whether or not he has good potential for advancement by 40 percent; a developmental plan is initiated as a result of participation in the program by 36 percent; and the assessment center staff monitors the subsequent development of the assessee by 34 percent. Thus, it appears that organizations tend to focus more on the immediate feedback process rather than with the long-term utilization of the results.

Fifty-five organizations completed the portion of the questionnaire concerning the 10 suggested uses of assessment center results. Table 2 shows the results of the three-way analysis of variance with one data point per cell. Organizations are included in the ANOVA table as an organismic variable (Edwards, 1960) because the primary interest is in evaluating the interaction between this variable and the treatment variables rather than

differences in the organismic variable by itself. Differences exist at the .001 level of significance among the 10 uses, actual versus ideal situations, and 55 organizations. The three two-way interactions between these three variables produce significant differences at the .001 level as well.

TABLE 2
ANOVA: Actual versus Ideal Use of Results

<i>Variables</i>	<i>Degrees of Freedom</i>	<i>Sum of Squares</i>	<i>Mean Squares</i>	<i>F Ratio</i>
Uses (U)	9	464.5	51.60	82.30*
Situation (S)	1	647.6	647.60	1032.85*
Actual versus Ideal				
Organizations (O)	54	672.6	12.45	19.86*
U \times S interaction	9	84.1	9.34	14.90*
U \times O interaction	486	1130.1	2.33	3.71*
S \times O interaction	54	266.8	4.94	7.88*
Error	486	304.6	.63	—

* $p \leq .001$

Since the analysis of variance produced significant overall differences, a Student's paired *t*-test was used to determine statistical significance between the "actually is now" and "ideally should be" ratings for each individual use. Table 3 lists the 10 different uses of assessment center results in descending order of actual utilization mean ratings. Assessment center results are presently given the most weight for (1) identifying strengths and weaknesses of employees and (2) making promotional decisions. These two uses are the only ones rated above the midpoint (four) on the seven-point scale. However, nine of the 10 uses are ideally rated above this midpoint. Furthermore, all 10 uses are rated significantly higher from this ideal perspective than current usage rates. Thus, the analysis of variance

TABLE 3
Student's Paired *t*-test for Individual Uses^a

<i>Various Uses of Assessment Center Results</i>	<i>Mean Actual Ratings</i>	<i>Mean Ideal Rating</i>	<i>Increase</i>	<i>Paired <i>t</i>-test Value</i>
Identifying strengths and weaknesses of employees	4.88	5.66	.78	5.25**
Making promotional decisions	4.35	4.72	.37	2.75*
Establishing a developmental plan for employees	3.69	5.33	1.64	9.09**
Developing employees with high managerial potential	3.59	5.43	1.84	8.24**
Aiding in employee career planning	3.47	5.45	1.98	10.20**
Determining organizational training needs	3.10	5.29	2.19	11.18**
Improving an employee's performance in his present job	2.86	4.28	1.42	7.55**
Evaluating back-up replacements for managers	2.67	4.72	2.05	9.64**
Conducting long-range manpower planning	2.48	4.48	2.00	9.65**
Determining assessor developmental needs	2.19	3.60	1.41	6.71**

^a54 degrees of freedom were used for Student's paired *t*-test ($n - 1$).

* $p = .01$

** $p = .001$

and the *t*-tests combine to show that organizations are using assessment center results considerably less than they feel is ideal.

Thirty-four organizations ranked the six criteria for promotional decision making. Only organizations that assessed people for the first level of management were eligible to answer this question. The six criteria are ranked in the following order of importance according to median ranks: (1 tie) recommendation of employee's boss, (1 tie) performance appraisal evaluations, (3) assessment center evaluation, (4) work experience in organization, (5) employee's career objectives, and (6) educational background. The respective median rank scores for these six criteria are 2.45, 2.45, 2.72, 3.44, 4.55, and 5.57, indicating that these organizations consider the boss's recommendation and performance appraisal evaluations to still be somewhat more important for promotional decision making than the assessment center evaluation. This result is somewhat surprising because the rationale for using an assessment center has been to make promotional decisions on the basis of demonstrated potential in the assessment center exercises.

Conclusions

While the majority of organizations in this study have used assessment centers for only a few years, the level of utilization of assessment center results does not seem to approach what the literature suggests. Few organizations follow administrative practices which deal with the long-term utilization of results. Similarly, only two of the 10 suggested uses are moderately utilized at present. Likewise, these organizations consider two traditional promotional criteria to be more important than the assessment center evaluation. Yet the organizations confirm the importance of the various uses based on their ideal ratings.

Based on this sample, the future outlook for assessment centers remains unclear. On the positive side, assessment centers seem to be valid predictors of subsequent managerial performance and their potential utilization appears to be largely untapped at present. On the negative side, however, assessment centers require a great deal of planning, time, and effort to effectively utilize the results. Future research should be directed at identifying the critical factors and conditions which facilitate the long-term utilization of assessment center results. When these are identified and followed organizations can hopefully begin to more effectively realize the potential of assessment centers.

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THE NATURE OF THE TASK AS A MODERATOR OF THE RELATIONSHIP BETWEEN EXTRINSIC FEEDBACK AND EMPLOYEE RESPONSES¹

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Previous research investigating the relationships between extrinsic feedback and employee responses has indicated inconsistent results. On one hand, researchers have reported that extrinsic feedback has a positive relationship with employee feelings of competence and intrinsic motivation (Arnold, 1976), perceived need satisfaction (Ivancevich, Donnelly & Lyon, 1970) and satisfaction with work (Kim, 1975). On the other hand, Harrison (1969) found no relationship between direct formalized feedback and attitude change, Smith and Knight (1959) reported no difference on self-insight between groups receiving feedback and those not receiving feedback, and Kim (1975) found that extrinsic feedback had either no relationship or a negative relationship with satisfaction with fellow employees

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and with present pay. It is argued here that these apparently inconsistent results of extrinsic feedback can be reconciled by considering the nature of the task of the employee.

Cammann and Nadler (1976) have also suggested that the nature of task be used as a moderator variable for the relationships between extrinsic feedback and satisfaction and internal motivation. They, however, did not develop an explicit rationale for the moderating effect of the task. A rationale for the inclusion of task as a moderator variable will be presented here. It should also be noted that extrinsic feedback discussed here may incorporate both contingent and noncontingent extrinsic feedback and is not limited to contingent extrinsic feedback as discussed by Deci (1972) and others.

The nature of the task includes task skill variety, identity, significance, autonomy and intrinsic feedback (Hackman & Lawler, 1971). These core dimensions of the task are usually positively related to satisfaction and internal motivation (Hackman & Oldham, 1975). It is argued here that tasks high on the core dimensions provide the employee with positive stimulation and high levels of information on how well he is doing. When this positive stimulation and these levels of information exist, the employee does not need or require additional stimulation or information from extrinsic sources such as the supervisor or fellow employees.

Thus, the conflicting findings on the relationship between extrinsic feedback and employee responses may be due to the failure to incorporate the nature of the task. It is argued here that if the task itself is stimulating (high on all core dimensions) and is, therefore, a source of high satisfaction, internal motivation and information, extrinsic feedback will not be as closely associated with employee job satisfaction and internal motivation as when the task is not stimulating and, therefore, not a source of satisfaction, motivation and information.

The purpose of this study, therefore, is to suggest a possible reconciliation of the conflicting findings on the relationship between extrinsic feedback and employee responses by incorporating the nature of task as a moderator variable. The *hypothesis* to be tested is that the nature of the task will moderate the relationship between extrinsic feedback and employee responses such that: *The level of employee responses in nonstimulating tasks with high extrinsic feedback will be higher than the level with low extrinsic feedback, whereas in stimulating tasks the level of employee responses with high extrinsic feedback will be equal to the level with low extrinsic feedback.*

Method

Sample—The sample from which data for this study were drawn was composed of 272 employees of a large midwestern public utility. Of the 272 respondents, 218 were male and 54 were female, and their average age was between 40 and 44 years. The level of education reported in 98 percent

of the cases was a bachelor's degree or less, although a large number of the respondents (118) had completed some college-level course work. Thirty-two of the respondents (12 percent) were nonsupervisors, 189 (69 percent) were first-level supervisors and 51 (19 percent) were second-level supervisors or higher. Average time with the organization was 16 to 20 years, although 97 (35 percent) of the respondents had tenure of more than 25 years. The respondents completed a questionnaire which was administered at the company location on company time. All respondents were assured complete confidentiality. The process of completing the questionnaires took about one hour.

Measures—Task characteristics were measured by the Job Diagnostic Survey (Hackman & Oldham, 1975). The task characteristics measured were skill variety, identity, significance, autonomy and feedback. The internal reliabilities (Cronbach-alpha) for those scales are: .80, .69, .73, .67, and .73 respectively. Those scales were combined additively (correcting for length) to form a summary measure reflecting the degree of stimulation of the task.

Extrinsic feedback was measured by combining additively three items taken from the Job Diagnostic Survey. They are: (1) To what extent do managers or co-workers let you know how well you are doing on your job?; (2) supervisors often let me know how well they think I am performing the job; and (3) the supervisors and co-workers on this job almost *never* give me any "feedback" about how well I am doing in my work (reversed). The internal reliability of this scale was .79.

Internal work motivation of workers was also measured by additively combining six items taken from the Job Diagnostic Survey. They are: (1) My opinion of myself goes up when I do this job well; (2) I feel a great sense of personal satisfaction when I do this job well; (3) I feel bad and unhappy when I discover that I have performed poorly on this job; (4) my own feelings generally are *not* affected much one way or the other by how well I do on this job (reversed); (5) most people on this job feel a great sense of personal satisfaction when they do the job well; and (6) most people on this job feel bad or unhappy when they find that they have performed the work poorly. The internal reliability for the scale in this study was .70.

Satisfaction with work itself, supervision and fellow workers was measured by the Job Descriptive Index (JDI) (Smith, Kendall & Hulin, 1969).

The correlations among these variables were: task with extrinsic feedback (.38), satisfaction with work (.59), supervisor (.28), fellow workers (.29) and internal motivation (.58); extrinsic feedback with satisfaction with work (.33), supervisor (.53), fellow worker (.27) and internal motivation (.29); satisfaction with work with satisfaction with supervisor (.34), fellow workers (.30) and internal motivation (.53); satisfaction with supervisor with satisfaction with fellow workers (.26) and internal motivation (.20); and satisfaction with fellow workers and internal motivation (.24).

Because of the possible influence of sex differences, organizational level or tenure of employees on the moderator effects of task between the extrinsic feedback-employee response relationship, these variables were correlated with the task, extrinsic feedback and employee responses. The results indicated low and nonsignificant correlations; therefore the sample was analyzed as one entity.

Analysis—A priori specification of cell means to be contrasted was determined. This specification was used in lieu of the overall analysis of variance *F* test. Two contrasts between the cell means employed for this study were orthogonal, and therefore they were statistically independent of each other. The specified means to be contrasted were tested for significance by *t*-tests, thus making an initial *F* test unnecessary (Nie, Hull, Jenkins, Stenbrenner & Bent, 1975). Furthermore, post hoc comparisons of cell means, which would have been necessary with the traditional analysis of variance, would have been unnecessarily conservative in light of the hypothesis. The extrinsic feedback scale and the summary task scale were dichotomized at the median. The workers in the sample were then placed into one of four cells based upon their classification on each of these scales. The contrasts to test the hypotheses were then analyzed.

Results

Table 1 presents the means and the standard deviations of the four employee response measures for each hypothesized cell. As shown in Table 1, under a nonstimulating task condition, satisfaction with work for employees perceiving a high degree of extrinsic feedback was significantly higher than for employees perceiving a low degree of extrinsic feedback ($\bar{X} = 37.66$ versus $\bar{X} = 32.35$; $t_{1,268} = 3.49$; $p < .001$). On the other hand, under a stimulating task condition, satisfaction with work for employees perceiving a high degree of extrinsic feedback was not

TABLE 1
Means and Standard Deviations of Job Satisfaction Measures and Internal Motivation for the Specified Cells to be Contrasted ($n = 272$)^a

Dependent Measures		Condition			
		Stimulating Task		Nonstimulating Task	
		Low Extrinsic Feedback ($n = 41$)	High Extrinsic Feedback ($n = 58$)	Low Extrinsic Feedback ($n = 120$)	High Extrinsic Feedback ($n = 53$)
Satisfaction—Work	\bar{X}	42.29	42.32	32.35	37.66
	<i>sd</i>	8.28	6.70	10.78	8.28
Satisfaction—Supervision	\bar{X}	36.97	46.34	32.85	42.20
	<i>sd</i>	11.91	6.44	13.37	10.91
Satisfaction—Co-worker	\bar{X}	42.00	43.51	32.83	40.66
	<i>sd</i>	9.73	11.28	13.98	11.66
Internal Motivation	\bar{X}	28.43	27.86	24.48	26.26
	<i>sd</i>	3.33	3.56	4.22	3.82

^aThe higher the value, the higher the level of satisfaction.

significantly different from that for employees perceiving a low degree of extrinsic feedback ($\bar{X} = 42.29$ versus $\bar{X} = 42.32$; $t_{1,268} = .019$; *n.s.*).

The same pattern of findings was observed for satisfaction with co-worker and internal motivation. Under a nonstimulating task condition, satisfaction with co-worker and internal motivation for employees perceiving a high degree of extrinsic feedback were significantly higher than for employees perceiving a low degree of extrinsic feedback ($\bar{X} = 40.66$ versus $\bar{X} = 32.83$, $t_{1,268} = 3.81$, $p < .001$, and $\bar{X} = 26.26$ versus $\bar{X} = 24.48$, $t_{1,268} = 2.77$, $p < .006$, respectively). Under a stimulating task condition, on the other hand, satisfaction with co-worker and internal motivation for employees perceiving a high degree of extrinsic feedback were not significantly different from those for employees perceiving a low degree of extrinsic feedback ($\bar{X} = 43.51$ versus $\bar{X} = 42.00$, $t_{1,268} = 1.21$, *n.s.*; and $\bar{X} = 27.86$ versus $\bar{X} = 28.43$, $t_{1,268} = 1.11$, *n.s.*). These findings strongly supported the stated hypothesis.

For satisfaction with supervision, the hypothesis was partially confirmed. That is, as hypothesized, satisfaction with supervision was higher with high extrinsic feedback than with low extrinsic feedback under a nonstimulating condition ($\bar{X} = 42.20$ versus $\bar{X} = 32.85$, $t_{1,268} = 4.37$, $p < .001$). However, contrary to the hypothesis, there was a significant difference in the stimulating task condition. Satisfaction with supervisor was 36.97 with low extrinsic feedback and 46.34 with high extrinsic feedback ($t_{1,268} = 4.07$, $p < .001$). Although not hypothesized, the results also show that employee responses were higher under the same feedback conditions when the employee task was stimulating rather than nonstimulating.

Conclusion

This study investigated the extrinsic feedback-employee response relationship using the nature of the task as a moderator variable to reconcile the conflicting findings of past research. The nature of the task was used because of the stimulation and information opportunities it provides the employee. When the task itself provides these opportunities, it was hypothesized that the level of employee responses would be the same regardless of the level of extrinsic feedback. When the task does not provide these opportunities, however, high extrinsic feedback was hypothesized to be associated with higher levels of employee responses than low extrinsic feedback. The results of this study provide support for these hypothesized relationships.

Because these data have been collected from the same source with the same method, there are always potential problems such as a halo effect which bias or distort the results. Although there were moderate correlations among the variables, the magnitude and pattern generally suggest that the halo was not too severe. For example, the average correlations among the four employee responses indicated that each employee response variable explained only 10 percent of the variance in any other employee

response variable. Task design and extrinsic feedback showed only 16 percent common variance. The results using satisfaction with supervisor were different from those results of the other employee responses. Nevertheless, caution must be used in the interpretation of these results because of the modest shared variance among the variables.

The results of this study suggest that the use of extrinsic feedback is contingent upon the nature of the employee's task when considering employee satisfaction and internal motivation. This study hypothesized differential relationships between extrinsic feedback and employee responses based on the stimulating and informational qualities of the task.

Although the hypothesis was supported, there was no direct examination of the rationale. There may be additional aspects of the employee's work situation which could also contribute to the extrinsic feedback, task design and employee response relationships. Schuler (1978), for example, reported that extrinsic feedback was negatively related to role conflict and ambiguity which were negatively associated with task complexity, i.e., associated with simple tasks were higher levels of role conflict and ambiguity than with complex tasks. These results would suggest role conflict and ambiguity, in addition to the stimulating and information qualities of the task, be considered as possible rationale for the extrinsic feedback, task design, and employee response relationships.

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THE EFFECTS OF HOLDING GOAL DIFFICULTY CONSTANT ON ASSIGNED AND PARTICIPATIVELY SET GOALS¹

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The method by which a goal should be set is a subject of controversy in the goal setting literature (Latham & Yukl, 1975a). Classical organizational theorists such as Taylor (1911) argue that the goal should be set unilaterally by the supervisor. Modern organizational theorists such as Likert (1967) believe that employee goal acceptance and commitment are greater when the employee and the manager together determine the employee's goal. Hence, they argue for participatively set goals.

In an experiment with uneducated loggers, Latham and Yukl (1975b) found that crew participation in setting a weekly production goal resulted in the goal being attained significantly more often than was the case when the goal was assigned to the crew by a supervisor. Moreover, only the crews with participatively set goals had performance that was significantly higher than crews in a "do best" condition. This led the authors to agree with Likert that employee participation in goal setting may be important because it brings about goal acceptance and commitment. However, the difficulty level of the goal was significantly higher in the participative condition than in the assigned condition. Both laboratory (Locke, 1968) and field experiments (Latham & Yukl, 1975a) have shown that the higher the goal, the higher the performance.

In a second field experiment, Latham and Yukl (1976) found no significant differences in the productivity of typists randomly assigned to assigned and participative goal setting conditions. There was also no significant difference between the two goal setting groups on the difficulty level of the goals set or the frequency with which the weekly goals were attained. Moreover, responses to items measuring goal acceptance failed to reveal a significant difference between the two groups. Productivity, however, increased significantly in both conditions.

The process by which productivity increased in the two goal setting conditions differed. In the participative goal condition, the employees insisted on keeping the weekly goal at a high level regardless of whether it was attained. That production increased significantly is consistent with the theory (Locke, 1968) that high goals lead to high performance.

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In the assigned goal condition, the supervisors did not criticize the individual for failing to attain the goal. They simply lowered the goal the subsequent week so that the employee would be certain to attain it, and then gradually increased it. In short, the supervisors were highly supportive of the employees. The overall effect was as previously mentioned, high goals and high performance levels. There was no significant difference in the goal difficulty level between the two goal setting groups.

In a study of engineers/scientists, Latham, Mitchell, and Dossett (1978) found no significant differences in responses to questions on goal acceptance between individuals in the assigned and participative goal setting conditions. Moreover, there was no significant difference between the two goal setting groups in their responses to the perceived difficulty level of the goals. This occurred despite the fact that the employees in the participative condition set significantly higher goals than did the individuals in the assigned goal condition. The frequency with which the two groups attained their goals did not differ significantly. Only the performance of the individuals in the participative goal setting condition was significantly higher than that of individuals in the do best and control group conditions.

Taken as a whole, these three field experiments suggest that employee participation in goal setting is important to the extent that it leads to higher goals being set than a manager sets unilaterally. The purpose of the present experiment was to test this assumption by holding goal difficulty level constant between two goal setting conditions, assigned and participative.

Hypothesis 1—Setting a specific goal leads to higher performance on a brainstorming task than does a philosophy of trying to do one's best. In order for this hypothesis to be supported, more ideas should be generated in both the assigned and participatively set goal groups than in the do best group. This hypothesis is consistent with Locke's (1968) theory.

Hypothesis 2—Holding goal difficulty constant will result in a significant difference between assigned and participative goal setting conditions on measure of job performance (ideas generated), goal attainment, and goal acceptance. This hypothesis, although not supported by the above three studies, is consistent with classical and modern organizational theories.

The experiment was conducted in a laboratory setting because of the difficulty in holding goal levels constant in the day-to-day activities of employees in an industrial setting. A brainstorming task was used because of the high degree of commonality between the way this procedure could be run in a laboratory setting and the way it is actually conducted by the company that sponsored this research.

Method

Subjects and Procedure—College students ($n = 60$) enrolled in an introductory psychology class were randomly assigned to an assigned, participative, or do best goal setting condition. Since both laboratory (Taylor, Berry & Block, 1958) and field (Dunnette, Campbell & Jaastad, 1963) experiments have shown that nominal groups generate more ideas than individuals who work together, each subject worked alone.

Each individual in the participative goal setting condition was asked to set a specific goal as to the minimum number of ideas he could give for uses of wood within a 20-minute time span. If he attained the goal, he was to continue working until the 20 minutes expired.

The role of the experimenter was to coach the student to set a goal that was difficult but attainable. Thus, if an individual set a goal to generate two or 2,000 ideas, the experimenter (the second author) coached him to set a realistic goal by simply reiterating that "the goal should be difficult but attainable; are you sure this goal fits that description?" The experimenter then gave each individual a sheet of paper on which he was to list ideas for uses of wood. He was also given a list of categories pertaining to wood. The experimenter told each individual that these categories could be used to assist him in generating ideas, but he was by no means limited to them. The categories were: paper products, home uses, office uses, furniture, sports equipment, musical instruments, ability to carve, chip, saw, or burn. The experimenter repeated the goal that they had agreed upon, asked each individual to number his ideas as he listed them so that he would have knowledge of results (KOR), gave him a watch if he did not have one, and said he would return in 20 minutes. KOR was provided because it is a necessary condition for goals to affect performance (Erez, 1977).

At the end of the 20 minutes, individuals in the two goal setting conditions were asked to complete a questionnaire asking them to indicate on a five-point scale the degree to which they influenced and accepted the goal that was set.

The procedure followed in both the assigned goal and do best conditions was identical to that used in the participative condition except that in the assigned condition each individual was simply *told* the number of ideas that he should generate. This goal was equal to the number (goal) set by a person in the participative condition who was working in an adjacent room.

The individuals in the do best condition were asked to do their best to generate as many uses of wood as possible within 20 minutes.

Results

Responses to a questionnaire revealed that individuals in the participative condition felt they had significantly ($t = 9.19, p < .001$) more

impact in setting the goal ($\bar{X} = 4.26$, $sd = .96$) than did the individuals in the assigned condition ($\bar{X} = 1.86$, $sd = 1.34$). Moreover, the individuals in the participative condition ($\bar{X} = 4.60$, $sd = .81$) felt that relative to the experimenter, they had more influence in setting the goal than was reported by those in the assigned ($\bar{X} = 1.70$, $sd = 1.32$) condition ($t = 11.81$, $p < .001$).

There was a significant difference ($F = 5.07$, $p < .01$) in the number of ideas generated among the three groups. Planned comparisons using two-tailed t -tests indicated that the number of ideas generated in both the assigned ($\bar{X} = 84.55$, $sd = 33.58$) and participative ($\bar{X} = 77.55$, $sd = 24.64$) goal setting conditions were significantly higher than the do best ($\bar{X} = 58.55$, $sd = 20.52$) group ($t = 2.97$, $p < .01$, $t = 2.65$, $p < .02$, respectively). There was no significant difference between the performance of the assigned and participative goal setting conditions. Nor was there any significant difference between these two groups in their responses to the three questions on goal acceptance, either as individual items or as a pooled aggregate (Cronbach's alpha = .70). Goal attainment was exactly the same in the assigned and participative goal setting groups ($n = 17$ in each condition).

In order to determine whether a person's knowledge of goal attainment influences his subsequent report of goal acceptance, the goal acceptance responses of the six people who did not attain their goal was compared with five randomly selected sets of six individuals who did attain their goal. Mann Whitney U tests revealed no significant differences.

Ten judges who were not aware of the purpose of the experiment nor the three groups from whom the lists were obtained independently rated the quality of the ideas. This was done as a check on possible demand characteristics of goal setting that could have resulted in a mechanical listing of nonoriginal or redundant uses. The order in which each list was given to a judge was randomized. No significant difference was found.

The hypothesis that setting a specific goal leads to higher performance than urging people to do their best was accepted. The assumption by modern organizational theorists that allowing people to participate in setting their goal leads to higher performance, more frequent goal attainment, and greater goal acceptance than simply assigning it to them was not supported.

Discussion

The underlying principle of brainstorming is to *do one's best* to think of as many ideas as possible for solving a problem of interest. The present experiment supports Locke's (1968) contention that the philosophy of doing one's best is not as productive as setting a specific goal, even if KOR is provided. In brainstorming this means that the minimum number of ideas that an individual will attempt to generate in a given time period should be specified.

Of primary importance to this study was the finding that when goal difficulty is held constant, participation as such does not necessarily lead to higher performance or greater goal acceptance than is the case when the goals are assigned. This finding supports the conclusion reached by Latham et al. (1978) that participation in goal setting is important to the extent that it leads to the setting of a higher goal than that which is assigned by a supervisor.

The problem of integrating these findings with the existing literature on participation remains. One explanation for no significant difference in the goal acceptance measure between the two goal setting groups is that the validity of these measures may be suspect. However, other items on the questionnaire (e.g., the two checks on the participation manipulation) do consistently reveal differences between individuals in the assigned and participative goal setting groups (e.g., Latham & Yukl, 1976; Latham et al., 1978).

The rival hypothesis that the questionnaire measures reflected a social desirability response can be rejected on the basis of the unsolicited comments that subjects wrote on the questionnaire (e.g., "Of course I didn't have any say in the goal set; she told me what to do."). Responses of this type would appear to vitiate arguments that the subjects were reluctant to express themselves. Unsolicited comments received in field settings (e.g., Latham et al., 1978) are even more indicative that subjects are willing to express their true feelings.

It may be as Ronan, Latham, and Kinne (1973) have suggested that the presence of a supervisor/experimenter is sufficient to bring about goal acceptance providing that the goal does not appear capricious or whimsical to the employee. Likert (1977) has suggested that the key aspects of systems 4 management are goal setting and the principle of supportive relationships, given that work facilitation and technical competence are not a problem. Participation in itself may not be critical for high performance. In responding to this research, Likert noted that participation seems to be important because of the high goals that are set without them being perceived as difficult.

The importance of the principle of supportive relationships is supported by the findings of this and two previous studies (Latham & Yukl, 1976; Latham et al., 1978). In each of these three studies, the supervisor/experimenter in the assigned goal condition was instructed "not to come across as a General Patton, but to simply tell the employee what is expected of him." That the supervisors followed these instructions with the typists (Latham & Yukl, 1976) has been described in the introduction to this paper. That the managers who assigned goals to engineers/scientists (Latham et al., 1978) were also supportive was evidenced by oral and written comments from the employees indicating that they had little or no feelings of embarrassment, awkwardness, or resistance during their performance appraisal. Similar comments were made by individuals in the assigned goal condition in this experiment. Thus, it would appear that when

a manager is truly supportive of his employees in the sense described by Likert (1967), participation is important in goal setting to the extent that it leads to the setting of *high* goals.

An aspect of participation that was not investigated is the role that participation may play in increasing an employee's understanding of what is expected of him. In this and the previous series of studies reviewed, the performance criteria were explicit (e.g., trees cut, words typed, behaviors emitted, ideas generated). In highly ambiguous situations, employee participation in goal setting may be important because it not only leads to higher goals being set but greater understanding of the effort and behavior required than if the supervisor sets the goal unilaterally.

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INFLUENCE OF EMPLOYEE AGE, SEX, AND JOB STATUS ON MANAGERIAL RECOMMENDATIONS FOR RETIREMENT

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In recent years, there has been growing controversy over mandatory retirement policies. Proponents of mandatory retirement at a specific age cite the added costs of retaining high-salaried older workers, the need to open up new promotional opportunities for minorities and women, and the difficulty of having to evaluate older workers for continued employment.

Opponents of mandatory retirement argue that it is wasteful to force productive workers to retire at an arbitrary chronological age and that a worker's competence should be the only criterion for continued employment. They propose flexible retirement programs that permit some workers to retire early and permit others to postpone retirement beyond age 65.

Now that the mandatory retirement age has been extended by new legislation, managers and personnel specialists will soon be confronted with difficult decisions involving the administration of flexible retirement systems. The equitable administration of such systems requires accurate assessment of older workers' competence and effectiveness.

There is some evidence, however, that managerial judgments regarding the performance capacity of older workers are influenced by age stereotypes, that is, widely held beliefs regarding the characteristics of people in various age categories. For example, it has been demonstrated that older workers are perceived to be less capable of responding to creative and productive job demands, less interested in change, and less capable of coping with future challenges (Rosen & Jerdee, 1976a). Effects of these age stereotypes on a variety of personnel decisions have also been shown, with managers tending to withhold promotion and development opportunities from older employees compared to identically qualified younger employees (Rosen & Jerdee, 1976b).

The present study extends previous work by examining how age stereotypes influence managerial assessments of the desirability of initiating retirement procedures for older employees. It was hypothesized that under flexible retirement policies, managers' retirement recommendations for employees near the traditional retirement age of 65 are influenced by employee chronological age, even when objective performance and health data are held constant.

The second variable of interest was sex. There is considerable evidence that sex stereotypes affect a variety of organizational decisions (see, for example, O'Leary, 1974; Rosen & Jerdee, 1976c). It was expected that these effects would extend to retirement evaluations. Accordingly, it was hypothesized that under flexible retirement policies, women receive less favorable treatment than men of the same age with identical performance and health records. This would put the older female in the unenviable position of being a potential double victim of age and sex bias.

The third variable of interest was job status. It has been suggested that older workers holding high-status positions typically command high salaries and represent a large organizational expense. Accordingly, managers may often be eager to encourage early retirement for older employees who hold high-status positions. On the other hand, organizational investments in training and development are typically greater for employees in high-status positions compared to employees in low-status positions. Therefore, postponement of retirement for high-status employees permits the organization more time to capitalize on training investments. In view of these competing arguments, no prediction was made regarding the influence of employee job status on evaluations for continued employment.

In summary, the equitable administration of a flexible retirement plan requires managers to evaluate older employees' competence to continue on the job. The present study examines the effects of employee age, sex, and job status on managerial evaluations of the desirability of initiating retirement procedures for older workers.

Method

Participants and Design—Participants were 101 male and 41 female managers attending a management institute at the University of North Carolina. Participants ranged in age from 24 to 51 ($M = 32$) and had an average of eight years of managerial experience.

The three independent variables, age (62, 65, 68 years old), sex of employee (male, female) and job status (high, low) were combined in a $3 \times 2 \times 2$ factorial design.

Procedure—Experimental materials were embedded in an inbasket decision exercise. Participants were asked to assume the role of a company executive and react to a series of decision problems written in letter or memo form. One of the decision problems involved reviewing a candidate for possible retirement and was written in 12 versions so as to manipulate the variables of interest. Assignment of participants to experimental conditions was completely random. Each participant reacted to only one version of the retirement problem and was not aware that other versions existed.

The retirement decision problem and the manipulations of the independent variables were as follows:

Memorandum to: Director, METRO Division
From: Personnel Department
Subject: Retirement Review

In the past, all METRO employees faced mandatory retirement at age 65. Recently, however, METRO has adopted a flexible retirement policy, which applies to all employees over age 60. According to the new policy, the performance of each employee over age 60 will be thoroughly reviewed each year, and on the basis of performance and health data a decision will be made whether to continue the employee for the next calendar year. Under this policy, some employees may be retired before they reach 65, other employees will be retired at age 65, and still other employees might be retained considerably beyond age 65.

One of your most difficult decisions as a manager in the new METRO division is to review the performance of these older employees each year and make recommendations with respect to retirement. Attached is the resume for one of your employees.

Participants then reviewed an employee's performance appraisal and health data. Age was manipulated by depicting the employee as either 62, 65, or 68 years old. Sex was manipulated by using the names Ronald or Ruth Hopkins in alternate versions. Job status was manipulated by depicting the employee's current position as either a mail clerk with a monthly salary of \$700 (low status) or a computer operations executive with a monthly salary of \$2,000 (high status). Other information was constant across all experimental conditions.

Dependent Variable—Participants evaluated the strategy "initiate procedures for the employee's retirement" on a 6-point scale anchored by (1) Extremely undesirable and (6) Extremely desirable.

Results

In preliminary analyses, comparisons were made between male and female participants and between groups of participants in different age and experience categories. No significant differences were found. Accordingly, the major analysis was based on the responses of all participants.

The effects of employee's age, sex and job status on managerial retirement recommendations are shown in Table 1. None of the interaction effects were significant.

Age Effects—It was hypothesized that under flexible retirement policies, managers' retirement recommendations for employees near the traditional retirement age of 65 are influenced by employee chronological age, even when objective performance and health data are held constant. A significant main effect for age was found ($F = 9.12$; $df = 2, 132$; $p < .01$). The mean desirability ratings for initiating retirement procedures were 2.38, 3.31, and 3.54 for the 62 year old, 65 year old, and 68

TABLE 1
Effects of Employees' Age, Sex and Job Status
on Managerial Retirement Recommendations

Job Status	62 years		65 years		68 years	
	Male	Female	Male	Female	Male	Female
High	2.77	1.67	3.00	3.58	4.56	2.85
Low	2.75	2.30	3.50	3.18	3.58	3.50

sd = 1.56

Source	MS	F	ω^2	P
Age (A)	20.07	9.12	.10	.01
Status (B)	0.15	—	—	—
Sex (C)	9.34	4.24	.02	.05
A \times B	0.64	—	—	—
B \times C	1.86	—	—	—
A \times C	3.74	1.7	—	—
A \times B \times C	4.80	2.18	—	—
Within	2.20	—	—	—

year old, respectively. Participants perceived initiation of retirement procedures as undesirable when the employee was depicted as 62 years old, but progressively more desirable for employees depicted as 65 and 68 years old.

Sex Effects—It was hypothesized that under flexible retirement policies, women receive less favorable treatment than men of the same age with identical performance and health records. The findings contradicted this hypothesis. The observed mean ratings of desirability of initiating retirement procedures were 2.88 for females and 3.23 for males ($F = 4.24$; $df = 1, 132$; $p < .05$).

Job Status—A significant main effect was not found for job status. Mean retirement recommendation for low status employees was 3.16 compared to 3.00 for high status employees.

Discussion

Employee age (62 versus 65 versus 68) had a definite effect on the retirement evaluations made by participants in this experiment. This effect occurred even though each participant evaluated only one employee at one age and was not asked to make a choice between employees of different ages. Since employees at the three age levels were described identically in terms of job performance and current health, the differences in mean evaluations must be attributed to employee age.

Why was there a stronger tendency to initiate retirement procedures for older employees? One possible explanation is that participants responded on the basis of age stereotypes. As noted in the introduction, previous research has demonstrated that older workers are perceived to be less capable of responding to creative and productive demands, less interested

in change, and less capable of coping with future challenges. It is also possible that participants responded on the basis of expectancies in regard to health and absenteeism, or on the basis of a desire to make room for younger employees like themselves. Unfortunately, participants were not required to provide written justification for their decisions. A content analysis of written justifications could have shed additional light on the factors that underlie retirement recommendations.

It will become increasingly important to identify the influence of employee age on managerial judgments and to understand the processes underlying these judgments. The minimum age for mandatory retirement has been raised to 70, and there is even a possibility that age discrimination laws may be extended to cover all older workers, regardless of age. As public policy moves in this direction, managers may have difficulty avoiding the tendency to base decisions on employee age, especially if this tendency is based on deep-rooted stereotypes that have been reinforced by experience, custom, and legal sanction for many years.

There is also a need for clarification of the effects of sex on retirement evaluations. The findings suggest that women may be kept on longer than men. Women of a given chronological age may be perceived as physiologically younger and more fit than men of the same age because of women's longer life expectancy. Moreover, companies often pay less for both life and health insurance for women. Retirement of a female, particularly in a high status job (where the effect was strongest), may be seen as detrimental to the equal opportunity position of the organization.

The level of ambiguity surrounding the retirement decision in this experiment was fairly high, involving uncertainties regarding job demands and stresses and uncertainties regarding physical and psychological limitations associated with aging. To varying degrees, similar uncertainties exist in actual practice. In view of the current movement toward flexible retirement, it is especially important to direct research efforts at reduction of these uncertainties through better job analysis and job design and better performance appraisal systems. In addition, there is a need to help managers appreciate how age stereotypes can influence judgments affecting the career options of older workers.

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Jay S. Kim is an Assistant Professor in Organizational Behavior at The Ohio State University. He received his M.S. in Production Management from the University of Rhode Island and Ph.D. in Organizational Behavior from Michigan State University. Professor Kim has published articles in the areas of personality task interaction, effects of feedback and goal setting, and general motivation and job satisfaction. Professional memberships include the Academy of Management and the American Institute for Decision Sciences.

James L. Koch is an Associate Professor of Management in the Graduate School of Management at the University of Oregon. Now on leave from the University of Oregon, he is engaged in field research and management training with Pacific Gas and Electric. He has authored many papers on various quality of work life topics and is especially interested in field-experiment based research involving work system redesign.

Gary P. Latham is currently teaching in the Management Department at the University of Washington. After graduating from Dalhousie University in Canada, he earned a Master's degree at Georgia Institute of Technology and a Ph.D. (both degrees in psychology) at the University of Akron. Dr. Latham has published numerous scientific articles and is active in the American and Canadian psychological associations. His research interests include goal setting, performance appraisal, reward systems, and the application of behavioral modeling to human resource problems.

Vincent A. Mabert is an Associate Professor of Management at Bowling Green State University in the College of Business Administration. He received his B.S., M.B.A., and Ph.D. from Ohio State University. Dr. Mabert currently is involved in forecasting research where interventions are present. He is a member of TIMS, ORSA, APICS, AIDS, and AIIE and has published many articles in the areas of forecasting and scheduling.

Myles Marcus is a Senior Distribution Planning Analyst at Baxter Travenol Laboratories. He received a B.B.A. in Operations Analysis from the University of Toledo in 1974 and an M.S. in Operations Management from the Krannert School of Management, Purdue University, in 1976. He has been involved with forecasting and inventory requirements systems for Travenol's European and Canadian subsidiaries and currently is working on echelon stocking and forecasting systems projects. He is a member of ORSA and AIDS. Mr. Marcus has previously published works.

Frederick C. Miner, Jr. is an Assistant Professor of Management at Saint Mary's University in Halifax, Nova Scotia. He received his B.A. from Gettysburg College; M.B.A., University of Utah, and Ph.D. from the University of Minnesota. Dr. Miner recently accepted the Directorship of the M.B.A. Program at Saint Mary's, where he previously held the position of Chairman of Business Administration. While his research interests are varied, he is interested particularly in the areas of decision making, educational techniques, and attitude formation.

James H. Morris is an Assistant Professor of Organizational Behavior in the Graduate School of Business, University of Alabama, and Research Associate in the Management Institute of Alabama. He received his Ph.D. from the Graduate School of Management at the University of Oregon in 1977. His research on role processes in work organizations is continuing with a longitudinal, multiple organization study. Dr. Morris also is involved in several experiments concerning self theory.

Charles O'Reilly is an Assistant Professor of Business Administration, University of California, Berkeley, California. He received his degree from the Graduate School of Business at the University of Berkeley in 1976 and was on the faculty in the School of Public Health at Berkeley during 1975-1976. Dr. O'Reilly's research interests include organizational communication and decision making, personnel, and labor relations, especially as these apply to the management of public organizations.

H. Joseph Reitz is Professor of Management at the University of Florida. He received his Ph.D. from MIT in 1969. His research is in individual and cross-cultural motivation and in group decision making. His works have been published in journals of applied counseling, cross-cultural and social psychology, and management. Dr. Reitz is the author of *Behavior in Organizations* (Irwin, 1977) and co-author of *Groups and Organizations* (Wadsworth, 1971). He is a member of the Academy and APA and has served as Vice-President of AIDS.

Karlene H. Roberts is Professor of Business Administration at the University of California-Berkeley. She received her Ph.D. in Psychology from the same university. Her most recent publication is a book with Charles Hulin and Denise Rousseau entitled *Toward an Interdisciplinary Science of Organizations* (Jossey-Bass, 1978). Dr. Roberts is active in the areas of organizational communication and research strategies. She is doing research on differential responses by part and full-time workers, a project supported by the Department of Labor.

Benson Rosen is an Associate Professor of Business Administration at the University of North Carolina at Chapel Hill. He received his B.S., M.A., and Ph.D. degrees in Psychology from Wayne State, Detroit, Michigan. Professor Rosen has published numerous articles in *Applied Psychology*, the *Harvard Business Review*, and *Personnel Administration*. His research interests are in the field of organizational justice, particularly issues of sex and age discrimination. Professional membership include the Academy of Management and the American Psychological Association.

David P. Rutenberg is a Professor in the School of Business, Queens University, Kingston, Canada. After completing his Bachelors Degree in Engineering from the University of Toronto, he worked for

Standard Oil of California in refinery planning. Dr. Rutenberg received his M.B.A. and Ph.D. in International Business and Operations Research at the University of California-Berkeley. From 1967 to 1977 he was on the faculty of Carnegie Mellon in Pittsburgh, Pennsylvania. He has visited Poland, Rumania, Hungary, and Bulgaria as the American Selector for a faculty exchange program in management funded by the Ford Foundation and administered by the International Research and Exchanges Board of New York.

Lise Saari is a doctoral student in psychology at the University of Washington. She received her M.A. from the University of Washington in 1978. Her research interests include goal setting, performance appraisal, reward systems, and the application of behavioral modeling to human resource problems. She is a student member of the American and Canadian psychological associations.

Randall S. Schuler is Assistant Professor in the Faculty of Management Sciences, The Ohio State University. He has written articles in the areas of leader behavior, task design, employee satisfaction and performance, organizational structure, organizational communication, stress and time management, and role conflict and ambiguity for various professional journals and newspapers. Professor Schuler has done consulting with several organizations in Ohio. He has been associated with The Pennsylvania State University, Cleveland State University, and Michigan State University.

John E. Sheridan is Associate Professor of Organizational Behavior in the Department of Organizational Behavior, College of Business Administration, The Pennsylvania State University. He received his Ph.D. from Penn State in 1973. Dr. Sheridan has published numerous articles concerning motivation and leadership and is now working under a federal grant investigating performance appraisal of nursing home employees. He is a member of two editorial review boards: *Academy of Management Journal* and the *Journal of Business Research*.

Robert E. Spekman is an Assistant Professor of Marketing at the University of Maryland, College Park, Maryland. He received a Ph.D. in Marketing from Northwestern University in 1977, where he also minored in Organizational Theory. Dr. Spekman's current research interests deal with organizational buying behavior, interorganizational relationships, marketing for not-for-profit institutions, boundary spanning activities, and the organization-environment interface.

Richard Staelin is Associate Dean and Associate Professor at Carnegie-Mellon University's Graduate School of Industrial Administration. Prior to joining the faculty in 1969, he worked for the Advanced Systems Development Division in IBM's Market Analysis Group. He has published more than 24 articles in various research journals and is on the editorial boards of the *Journal of Marketing Research* and the *Journal of Consumer Research*. Dr. Staelin's current research interests are concerned with consumer and managerial decision making, channels of distribution, and consumer protection regulation.

Richard M. Steers is an Associate Professor of Management and Director of Doctoral Studies in the Graduate School of Management at the University of Oregon. He received his Ph.D. from the University of California, Irvine, in 1973. Dr. Steers has published extensively in various journals, is author or co-author of four books, and serves on the editorial boards of the *Administrative Science Quarterly*, *Academy of Management Journal*, and the *Journal of Business Research*. He has been the recipient or corecipient of a variety of research grants and contracts from various agencies, including NIH, NIH, General Motors Corporation, U.S. Department of Labor, and the Office of Naval Research.

Donald J. Vredenburg is an Assistant Professor of Management and Organization Sciences in the School of Business Administration at Wayne State University in Detroit, Michigan. He received a Ph.D. in Management Studies from the State University of New York at Buffalo in 1975. Although most of his previous publications focused on leadership, his other interests include organizational design and technology.

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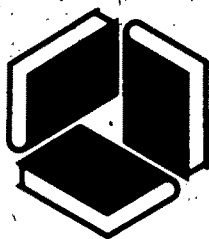
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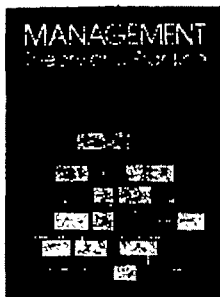
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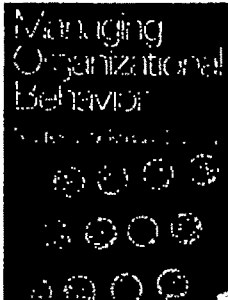
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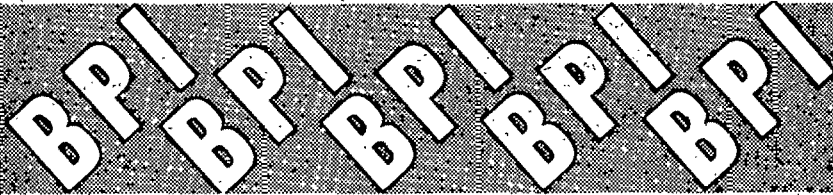
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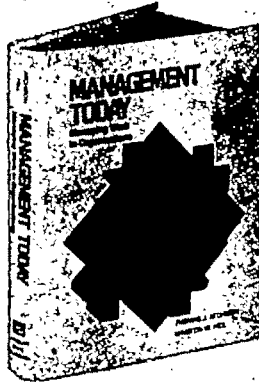
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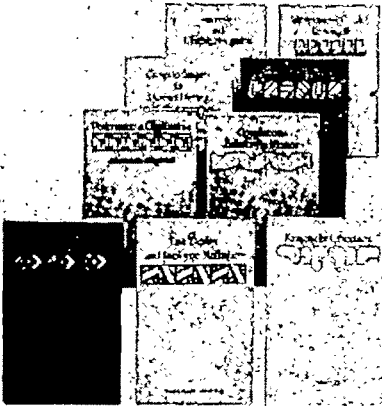
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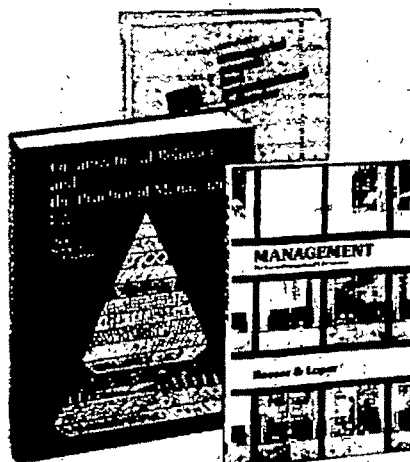
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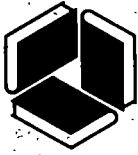
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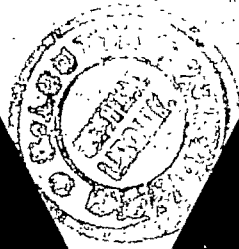
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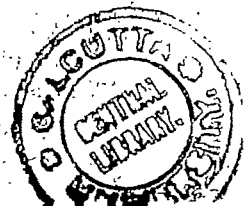
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High and Low Task Stimulation Jobs: A Causal Analysis of Performance-Satisfaction Relationships

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This study of project engineers investigated the direction and causal influence of a number of performance-satisfaction relationships. For the high task stimulation jobs, it was found that high intrinsic satisfaction caused decreases in subsequent supervisory performance rating and cost performance. For the low task stimulation jobs, extrinsic satisfaction was inferred to be the cause of increased supervisory ratings and cost performance.

The relationship between job satisfaction and job performance continues to be of theoretical, empirical, and practical interest among organizational researchers and managers (Greene & Craft, 1977; Porter & Lawler, 1968; Organ, 1977). The available evidence suggests little agreement among either researchers or managers about the satisfaction-performance relationship. Vroom, after carefully evaluating 20 empirically based studies, concluded:

There is no simple relationship between job satisfaction and job performance. Correlations between these variables vary within an extremely large range and the median correlation of .14 has little theoretical or practical importance. We do not know the conditions which affect the magnitude and direction of relationships between satisfaction and performance (1964, p. 186).

Other comprehensive reviews of research on the satisfaction-performance relationship also have pointed to predominantly insignificant and tenuous empirical findings (Brayfield & Crockett, 1955; Herzberg, Mausner, Peterson, & Capwell, 1957; Schwab & Cummings, 1970).

In their review, Schwab and Cummings (1970) recognized the disappointing empirical results and suggested needed research strategies to study the satisfaction-performance relationship. Rather than indicating that more testing is needed of the assumption that satisfaction causes performance, Schwab and Cummings questioned and encouraged more consideration of the directionality of this linkage.

In an interesting reappraisal of the satisfaction causes performance hypothesis, Organ (1977) introduces an equity and reciprocity relationship in social exchange explanation. He proposes that individuals seek to reciprocate their benefactors (supervisors) and that from this conceptual base one might deduce the satisfaction causes performance hypothesis. The deduction rests on two implicit qualifying assumptions: first, that satisfaction results from factors that can be personalized in their association with the actions of an official organizational representative (supervisor) and, second, that increased performance is perceived as a viable and worthwhile form of reciprocation to the immediate supervisor or benefactor.

The present study examines the satisfaction-performance relationship using longitudinal data. It focuses on the source and direction of causal influence in the relationships between performance ratings (supervisor) and performance output (employee), and intrinsic and extrinsic satisfaction. A cross-lag correlational design, corrected cross-lag procedures, dynamic correlations, and frequency-of-change-in-product-moment (FCP) techniques are used to analyze the data.

SELECTED RESEARCH

Prior to the Hawthorne studies, job performance often was the main dependent variable studied by organizational researchers. During the human relations era following the Hawthorne studies, job satisfaction became another popular dependent variable for empirical study (Wanous, 1974). Even today these two important variables are being discussed, debated, and researched. Locke (1970) suggested that satisfaction is primarily a result of performance and only indirectly a cause of performance.

Cherrington, Reitz, and Scott (1971), following the Porter and Lawler (1968) model, indicated that there is no inherent relationship between satisfaction and performance. They indicated that one can produce any empirical relationship between task performance and self-reports of satisfaction that one wishes by manipulating the performance to reward contingency. In a laboratory study Cherrington et al. (1971) found essentially zero correlations between satisfaction and performance for the total sample. However, when the sample was divided into appropriately reinforced and inappropriately reinforced subgroups, significant positive correlations were found for the first group, but significant negative correlations were found for the second.

Sheridan and Slocum (1975), using a cross-lag correlation design, tested causal relationships between work performance and four different measures of job satisfaction over a one year period. The results indicated that performance caused satisfaction for a line and staff management sample. For a unionized machine operator sample, however, a reduction in need deficiencies influenced higher levels of job performance.

A reanalysis of results from previous cross-lag correlation studies of performance-motivation relationships was reported recently by Sheridan and Slocum (1977). Data of three empirical studies (Lawler, 1968; Lawler & Suttle, 1973; Sheridan, Downey & Slocum, 1975) were reinterpreted because of recent suggestions concerning stationarity. Kenny (1975) suggested that the interpretation of cross-lagged correlations may be confounded by the lack of stationarity in the causal process. Sheridan and Slocum (1977) found that the concurrent correlations were not stationary over time in any of the three reinterpreted studies.

Wanous (1974) collected job satisfaction and performance data from 80 newly hired female telephone operators after one and three months' work experience. A combination of cross-lagged and dynamic correlations was used to make causal inferences about the satisfaction-performance relationship. When job satisfaction was split into extrinsic and intrinsic components, the findings indicated that performance causes intrinsic satisfaction and extrinsic satisfaction causes performance.

Greene (1973) investigated the source and direction of causal influence between satisfaction and performance. The sample consisted of 62 first-line managers representing both line and staff functions of the marketing and financial divisions of a large manufacturer. Satisfaction was found to be an effect and not a cause of the performance ratings of managers. The current performance of the manager was evaluated by two of his peers using semantic differential scales.

Lawler (1969) and Hackman and Lawler (1971) hypothesized that performance will lead to satisfaction of higher order needs if tasks provide opportunities to do a meaningful and identifiable portion of the work, if they result in outcomes that are intrinsically meaningful, and if they provide feedback about what has been accomplished. Theoretically, on tasks that have these characteristics, feelings of accomplishment are the direct result of good performance. The *stimulation* for performance would be considered inherent in the nature of the task itself. Therefore, it seems reasonable that jobs that possess these characteristics be referred to as *high stimulation jobs*. Those that do not possess these characteristics and thus, in and of themselves, are not likely to provide satisfaction as an outcome of high job performance can be referred to as *low stimulation jobs*.

A study of 214 employees in a state agency examined the relationship between satisfaction and performance (Baird, 1976). It was hypothesized that on stimulating jobs, satisfaction would be positively related to performance. Analysis of variance and correlational analysis revealed that the relationships between performance and satisfaction were exactly opposite to those hypothesized.

Although literature reviews and a number of empirical studies have focused on the performance-to-satisfaction relationship, only a few investigators have directly examined the issue of causality. Sheridan and Slocum (1975) used performance ratings to study the relationship. Wanous (1974) used recently hired employees and did not attempt to

correct the cross-lagged correlations for changes in measurement reliability over time. By not testing for congruent influence (Feldman, 1975), Wanous also did not rule out alternative explanations for the results.

Baird (1976) introduced an interesting notion that task stimulation can improve our understanding of the performance-satisfaction relationship. His research did not address the issue of causal inference; it relied solely on static correlational analysis to draw conclusions.

THE STUDY

The present study builds on the notions of causality and task stimulation using longitudinal data collected from engineers. It tests a number of crucial aspects of the performance to satisfaction relationship that to date have been untested. First, a test of the performance-satisfaction relationship using data on high task stimulation and low task stimulation jobs has not been made previously. If differences in relationships are found between high and low task stimulation jobs, important managerial implications may be suggested. Managers could use this information to reward employees, redesign jobs, make alterations in their supervisor practices, and to match individual preferences for stimulation with jobs. Second, only a few studies have used corrected cross-lagged and dynamic correlations as well as standardized scores for each participant. Third, a test for both causal direction and incongruent influence has not been made in studying performance-satisfaction relationships. The FCP method can be used to examine the incongruent influence issue. Only a few organizational researchers have used this method in studying various dimensions such as leadership, role conflict, and merit pay (Greene, 1973; Szilagyi, 1977). Finally, the majority of studies on performance-satisfaction relationships have used subjective performance ratings. In the present study, both supervisory ratings (subjective) and an actual performance measure (more objective) are used.

Hypotheses

In order to examine properly some of the untested aspects of the performance to satisfaction relationship, a number of hypotheses were considered. The following were developed by integrating the theoretical, methodological, and practical contributions from previous work:

1. *Supervisory performance rating (S) will be causally related to intrinsic (I) and extrinsic (E) satisfaction for engineers working on high stimulation jobs.*

2. *The actual cost performance index (C) will be causally related to intrinsic (I) and extrinsic (E) satisfaction for engineers working on high stimulation jobs.*

3. *Extrinsic satisfaction (E) will be causally related to both the supervisory performance rating (S) and performance cost index (C) for engineers working on low stimulation jobs.*

METHOD

Sample

A large engineering construction and development organization that constructed power plants, nuclear equipment, and numerous electronic devices for the government and industrial customers was used as the field setting. Within the organization four categories of project teams were used. All project team leaders worked with clients and had various managerial, cost, scheduling, and delivery responsibilities. There were 38 project team leaders involved on electronic equipment projects, 63 working on power plant construction, 50 involved with government contracts, and 59 involved with construction projects for industrial and commercial customers. Approximately 90 percent of the project team leaders were engineers. The project leaders in each job category were similar on such demographic factors as age, education, job tenure, and engineering experience.

During structured interviews with a sample of the project team leader superiors it was determined that power plant and electronic projects were considered more challenging, exciting, and satisfying to engineers than were the other types of undertakings. The government and construction projects were considered to be generally low in task stimulation. In order to examine more rigorously this interview-based finding, four observers who were project general managers rated the four types of project leader jobs using the Job Diagnostic Survey (JDS). Each observer was familiar with each major type of project and spent approximately two hours a day over a two week period actually visiting project sites and reviewing the work of the project team leaders. At the end of the formal two week observation period the observers completed the JDS.

An overall measure of task stimulation for the four types of projects was obtained by summing the four observers' JDS ratings of the five job characteristics evaluated for each project (Jenkins, Nadler, Lawler & Cammann, 1975). The four summed scores for each type of project then were averaged. Interrater reliability of the summed scores was .90. The average score served as the "observed task stimulation" score for the four types of project leader jobs. The stimulation scores were $M' = 21.6$ (power plant), $M' = 21.1$ (electronics), $M' = 14.0$ (construction), and $M' = 12.1$ (government). Both the power plant and electronics task stimulation scores were significantly higher than were the mean scores for the construction and government jobs. The method of summing the observer scores for each type of project is supported by the work of Brief, Wallace, and Aldag (1975), who found simple additive models to be as predictive as more complex multiplicative models. The observer ratings for job stimulation had an internal consistency reliability of .85.

Factor analysis results provided further justification for summing the five job characteristics measured by the JDS (Hackman & Oldham, 1975).

Of the 210 engineers working on projects in the company, 184 voluntarily agreed to complete the 15-item JDS. The factor analyses suggested that a single dimension representation would be the most parsimonious. Because of this finding and other empirical evidence that the five job characteristics combine in a linear manner, a single dimension (task stimulation) was used (Dunham, 1977; Dunham, Aldag, & Brief, 1977). The coefficient alpha of the 15-item scale was .83.

Management allowed the researcher to select randomly one of the high task stimulation jobs and one of the low task stimulation jobs and asked the engineers to participate in the study. The power plant job and the government contract job were selected. The power plant engineers were designated the high task stimulation sample, and the government contract engineers were designated the low task stimulation sample ($M' = 21.6$ versus $M' = 12.1$; $F = 49.8$, $p < .001$).

The 63 engineers working on power plant construction projects and the 50 engineers working on government contract projects were asked to participate voluntarily in the study. At the first data point (t_1), 53 of the 63 power plant engineers agreed to participate. Because of personal reasons, job duties, and special assignments, five of the original volunteers did not participate in the t_2 (six months after t_1) and t_3 (six months after t_2) data collection points. Therefore, 48 power plant construction engineers were included in the sample at the three data points, t_1 , t_2 , and t_3 .

The 50 government contract engineers also were asked to participate in the study. Forty-six participated in the t_1 data collection. However, again, sample shrinkage eliminated four engineers of this group from the final sample. Consequently, 42 government contract engineers made up the final sample.

Measures

The cross-lagged and FCP techniques used require that identical measurements of the variables studied—performance rating (S), cost performance index (C), intrinsic satisfaction (I), and extrinsic satisfaction (E)—be taken at two points in time with the same subjects. In the present study, the measures were obtained at three separate data collection points (t_1 , t_2 , t_3) six months apart. The time lag of six months was selected because of the convenience of being able to collect data from two sample groups at one time and because of the organization's concern about excessive intrusion by external observers.

The power plant and government contract engineer supervisors rated each engineer on a multitrait scale that was developed by the personnel division of the company. Five dimensions were rated for each engineer on a scale ranging from (1) low performance to (7) high performance. The rated dimensions were a. technical competence, b. dependability, c. job knowledge, d. planning ability, and e. cooperative activities.

The supervisor ratings on the five job performance dimensions were highly correlated, $.45 \leq r \leq .80$ (median $r = .61$). Thus, engineers' scores on each of the five dimensions were summated. In addition to the summated multitrait performance ratings for each engineer, a cost performance index was used as a quantitative indicator of performance. The company kept specific cost information for each phase of every project. The cost index was derived by dividing actual project phase costs by planned costs. An index greater than 1.00 indicated that planned-for costs were being exceeded. On the other hand, an index that was less than 1.00 indicated better than planned-for performance. It was generally accepted knowledge among project engineers and their superiors that the cost index was the most controllable and unambiguous measure of project engineer performance. The cost index and the summated performance rating were independent ($r = .04$, ns).

The project engineers' perceptions of extrinsic and intrinsic job satisfaction were determined by the Minnesota Satisfaction Questionnaire, Short Form (MSQ). Previous researchers (Weiss, Dawis, England, & Lofquist, 1967) developed the 20-item short form and tested it in measuring both intrinsic and extrinsic job satisfaction. The extrinsic and intrinsic dimensions were relatively independent ($r = .15$, ns). The four coefficient alphas for the two samples of the intrinsic and extrinsic dimensions all were above .80. Previous researchers have found similar reliabilities and have used factor analysis to derive the intrinsic and extrinsic factors for numerous samples across different occupations (Weiss et al., 1967).

Analytical Procedures

The cross-lag panel correlation model was introduced initially by Simon (1954). The cross-lag technique attempts to answer the question: Is A a stronger cause of B than B is of A ? It is not designed to answer the question: Does a change in A cause a change in B (Cook & Campbell, 1976)? Cross-lagged correlation was used because of the exploratory nature of the present study, its inclusion of uncontrolled variables, and its concern with causal relationships. This technique uncovers simple causal relationships between uncontrolled variables. It requires that measures of the variables be taken for at least two points in time. Then, in the case of two time intervals, t_1 and t_2 , six correlation coefficients in this study are computed for each pair of variables (e.g., $r_{C_1I_1}$, $r_{C_1I_2}$, $r_{C_1C_2}$, $r_{I_1C_2}$, $r_{I_2C_2}$, $r_{I_2I_2}$).

Inferences of causality can be made by examining the various correlation coefficients in the cross-lag model. For example, if cost performance (C) causes extrinsic satisfaction (E) for power plant engineers, using the t_1 and t_2 data points, the present (t_1) performance level should be more highly related to the future (t_2) state of extrinsic satisfaction. Comparisons of the relative magnitudes of the correlations between (C) and the states of satisfaction (E) provide a basis for evaluation of the $C \rightarrow E$ and $E \rightarrow C$ propositions. Therefore, if the power plant engineer's performance causes

extrinsic satisfaction, the magnitudes of the correlations should be such that $rC_1E_2 > (rE_1C_1 = rE_2C_2) > rE_1C_2$. Conversely, if extrinsic satisfaction is the causal variable, then one would expect that $rE_1C_2 > (rE_1C_1 = rE_2C_2) > rC_1E_2$. In addition, the magnitude of the two cross-lagged coefficients (rE_1C_2 and rC_1E_2) provides an indication of the extent of reciprocal causation.

Pelz and Andrews (1964) have noted that a deviation in the relative magnitudes of the static correlations (e.g., rC_1E_1 and rC_2E_2) from the pattern predicted by the model does not affect the researcher's ability to infer causality but does suggest that the time lag chosen does not correspond to the true time lag interval. In most studies the static correlations have been found to be unequal (e.g., $rC_1E_1 \neq rC_2E_2$). Kenny (1975), in order to eliminate this problem, designated a "corrected" cross-lag correlation. This method involves a reliability correction procedure.

Kenny's (1975) reliability correction method involves the calculation of a reliability rating determined by dividing a variable t_2 reliability by its t_1 reliability. A reliability ratio greater than one indicates an increase in reliability over time; a value less than one suggests a decrease in reliability. The calculated reliability ratio for a variable represents a measure of its communality with respect to other variables being measured. Therefore, at least three variables must be measured at both data collection points. In the present study, performance rating (S), cost performance (C), and intrinsic and extrinsic satisfaction (I and E) were the variables studied. A role conflict measure was used as the third variable to estimate reliabilities.

In analyzing each of the three variable cases for both samples (power plant engineers and government contract engineers) and the variables studied, reliability ratios were calculated. The reliability ratios were used to correct the observed cross-lagged correlations in a way similar to correcting a correlation for attenuation. In order to ascertain whether causal inferences can still be made, the statistical differences between each of the corrected cross-lag correlations (e.g., rC_1E_2 and rE_1C_2) were calculated using the Pearson-Filon method (Kenny, 1975).

Another potential limitation of the cross-lagged procedure is its inability to allow the researcher to rule out the possibility of additional variables causing the two variables of interest (e.g., C and E) to covary. Vroom (1966) introduced the use of dynamic correlation coefficients to address this problem. In the example of the relationship between C and E , a dynamic correlation coefficient is computed by correlating the difference in cost performance from t_1 to t_2 with the difference in extrinsic satisfaction from t_1 to t_2 . It is assumed that the stronger the correlation, the lower the probability that another variable caused performance and extrinsic satisfaction to covary.

Researchers have suggested that the dynamic correlation will be biased whenever the scores on the measurements of the variable of interest at t_2 regress toward the mean of the t_1 scores. When this form of regression toward the t_1 mean does occur, the t_1 scores on a variable will be negatively

correlated with the change scores on the same variable. To correct for this problem, the residual gain scores were used to control for the variance among the initial scores of each variable. This was accomplished by using partial correlations to compute the dynamic correlation, holding the initial scores on cost performance and extrinsic satisfaction constant. Given a pattern of cross-lagged correlations showing, for example, that a favorable cost performance index (C) causes high levels of extrinsic satisfaction (E), a large, highly significant, dynamic correlation would suggest the existence of a causal relationship.

Feldman (1975) indicated that a problem encountered with the cross-lagged technique is the limited number of causal inferences that the analysis makes possible. He states that it is not possible to distinguish between the source and direction of influence of two correlated variables. The researcher is not able to determine which variable had the greatest influence and whether it increased the correlation (positive effect) or decreased the correlation (negative effect).

The FCP technique was devised by Yee (1968; Yee & Gage, 1968) to overcome the inference limitations of the cross-lagged technique. The FCP technique requires that the data collected for each power plant and government contract engineer be placed into one of four categories. Using the power plant engineer performance cost index (C) and extrinsic satisfaction (E) as an example, the data were placed into a C+, C-, E+, E- category based on the following steps.

1. The t_1 and t_2 raw scores for C and E were converted to standard scores. Thus, $Z = \frac{x - \bar{x}}{s}$ was computed for each score.
2. The direction of influence, positive or negative, was identified for each case by determining if the cross-product of the t_2 Z-scores was greater or less than the cross-product of the t_1 Z-scores. If the cross-product of t_2 Z-scores, $Z_{C_2E_2}$ was greater than $Z_{C_1E_1}$, the direction of change is considered to be positive or congruent; that is, the interaction between performance cost and extrinsic satisfaction increased the overall correlation. If the cross-product of t_2 Z's is algebraically lower than the t_1 Z's, the direction of change is considered to be incongruent or negative.
3. The source of influence was determined by examining the cross-lagged Z products for each case. If the direction of influence was positive, the variable whose t_1 measure was part of this larger cross-lagged Z product was considered as the source of influence. On the other hand, if the direction of influence was negative (incongruent), the variable whose t_1 measure was part of the smaller cross-lagged Z product was considered the source of the influence.

Therefore, if the direction of change was *positive* (that is, $Z_{C_2E_2} > Z_{C_1E_1}$) and if $Z_{C_1E_2} > Z_{E_1C_2}$, then performance cost was considered the source of positive or congruent influence (C+). Conversely, if $Z_{E_1C_2}$

$> Z_{C_1E_2}$, extrinsic satisfaction was the source of positive influence ($E+$).

If the direction of change was negative (that is, $Z_{C_2E_2} < Z_{C_1E_1}$ and if $Z_{C_1E_2} > Z_{E_1C_2}$, then extrinsic satisfaction was the source of the negative influence ($E-$). However, if $Z_{E_1C_2} > Z_{C_1E_2}$, performance cost is considered the source of the negative influence.

4. After each of the cases was classified into one of the four categories ($C+$, $C-$, $E+$, or $E-$), chi-square tests were computed to determine if the number of cases placed in a category differed significantly from the number placed in the other three categories. Chi-square was computed using the general formula and the Yates correlation for continuity (Guilford, 1965).

RESULTS

The results of the cross-lagged correlation procedures and the FCP analyses are summarized in Tables 1 and 2. The Table 1 results suggest that the direction of change concerning the supervisor performance rating (S) and intrinsic satisfaction linkage should be interpreted as incongruent (Yee & Gage, 1968). Because $Z_{S_1I_1} > Z_{S_2I_2}$ and $Z_{S_1I_2} > Z_{S_2I_1}$, the implication is that I_1 (not S_1) is the source of influence and that such influence is negative. In other words, I_1 acted upon S_2 in such a manner as to decrease the static correlations shown in Table 1. The general lesson is that when positive static correlations decline from t_1 to t_2 , one must reverse the apparent message implied by the cross-lagged r 's. If $S_1I_2 > S_2I_1$, if both are positive, and the static r 's decline over time, the Yee-Gage (1968) conclusion is that I_1 caused S to decrease. That is, initial intrinsic satisfaction is inferred as the cause of a decrease in performance rating.

Further review of Table 1 also indicates incongruent change when the cost performance (C) and intrinsic satisfaction (I) relationships are examined. Note that the three static correlation sets (.30:.27, .27:.15, .30:.15) declined from t_1 to t_2 , from t_2 to t_3 , and from t_1 to t_3 . If the Yee-Gage interpretation is applied to these data, it appears that I_1 caused C to decrease. Thus, in both cases involving performance factors and intrinsic satisfaction, the direction of change must be considered incongruent. Intrinsic satisfaction would be inferred to be the cause of lower performance ratings (S) and lower cost performance (C) exhibited by the project engineers. Application of the chi-square tests indicated that intrinsic satisfaction was the primary source of influence ($\chi^2 = 15.09$, $p < .01$) and that the direction of influence of high initial intrinsic satisfaction was to decrease the correlation with performance ratings ($\chi^2 = 14.1$, $p < .01$). These and other chi-square results for various time periods and performance and satisfaction relationships are displayed in the last column of Table 1.

TABLE 1
Causal Analysis of Performance and Satisfaction Variables
For Power Plant Engineers: High Stimulation Job Category

Time Period	Corrected Cross-Lagged Coefficients	Static Coefficients	Dynamic Coefficients	FCP Tests (1)	FCP Tests (2)
A. Supervisory Performance Rating (S) and Intrinsic Satisfaction (I)					
t_1 and t_2	$rS_1I_1 = .51^{**}$	$rS_1I_1 = .31^*$	$r\Delta S_1 - S_1\Delta I_1 - I_1 = .52^{**}$	15.09**	14.12**
t_2 and t_3	$rI_1S_2 = .09$ $rS_2I_1 = .53^{**}$	$rS_2I_1 = .14$	$r\Delta S_2 - S_2\Delta I_2 - I_2 = .49^{**}$	14.78**	12.01**
t_1 and t_3	$rI_1S_3 = .15$ $rS_3I_1 = .49^*$	$rS_3I_1 = .11$	$r\Delta S_3 - S_3\Delta I_3 - I_3 = .50^{**}$	19.71**	15.35**
B. Supervisory Performance Rating (S) and Extrinsic Satisfaction (E)					
t_1 and t_2	$rS_1E_2 = .36^*$	$rS_1E_1 = .24^*$	$r\Delta S_1 - S_1\Delta E_1 - E_1 = .41^{**}$	2.81	1.98
t_2 and t_3	$rE_1S_3 = .19$ $rS_3E_1 = .11$	$rS_3E_1 = .07$	$r\Delta S_2 - S_2\Delta E_2 - E_2 = .38^{**}$	2.14	2.36
t_1 and t_3	$rS_1E_3 = .09$ $rE_1S_3 = .12$	$rS_3E_1 = .14$ $rS_1E_3 = .24^*$	$r\Delta S_3 - S_3\Delta E_3 - E_3 = .31^*$	2.61	1.09
C. Cost Performance Index (C) and Intrinsic Satisfaction (I)					
t_1 and t_2	$rC_1I_2 = .49^{**}$	$rC_1I_1 = .30^*$	$r\Delta C_1 - C_1\Delta I_1 - I_1 = .58^{**}$	19.87**	17.61**
t_2 and t_3	$rI_1C_3 = .03$ $rC_3I_1 = .48^{**}$	$rC_3I_1 = .27^*$	$r\Delta C_2 - C_2\Delta I_2 - I_2 = .54^{**}$	15.31**	14.61**
t_1 and t_3	$rI_1C_3 = .14$ $rC_3I_1 = .52^*$	$rC_3I_1 = .15$ $rC_1I_3 = .30^*$	$r\Delta C_3 - C_3\Delta I_3 - I_3 = .53^{**}$	13.18**	13.02**
D. Cost Performance Index (C) and Extrinsic Satisfaction (E)					
t_1 and t_2	$rC_1E_2 = .16$	$rC_1E_1 = .26^*$	$r\Delta C_1 - C_1\Delta E_1 - E_1 = .40^{**}$	2.98	2.04
t_2 and t_3	$rE_1C_3 = .12$ $rC_3E_1 = .14$	$rC_3E_1 = .22^*$	$r\Delta C_2 - C_2\Delta E_2 - E_2 = .37^{**}$	2.06	2.00
t_1 and t_3	$rE_1C_3 = .19$ $rC_3E_1 = .18$	$rC_3E_1 = .08$ $rC_1E_3 = .26^*$	$r\Delta C_3 - C_3\Delta E_3 - E_3 = .35^{**}$	2.14	2.09

* $p < .05$ ** $p < .01$

The results presented in Table 1 offer little support for either hypotheses 1 or 2. The incongruent direction of change finding indicates that initial intrinsic satisfaction causes subsequent decreases in performance rating and cost performance. The high task stimulation findings regarding causal relationships between performance and satisfaction were exactly opposite to those hypothesized.

The results in Table 2 for the government contract engineers suggest general support for the hypothesized performance-satisfaction relationships for low stimulation jobs. A review of the Table 2 data indicates a congruent direction of change. The positive static correlations do not typically decline from t_1 to t_2 or from t_2 to t_3 . Extrinsic satisfaction appears to be a powerful source of influence for supervisory performance rating as displayed by the Table 2B cross-lagged coefficients (.51, .54, and .50) for the three time periods; all $ps < .01$ and significantly stronger than the supervisory rating cause extrinsic satisfaction cross-lagged coefficients (.09, .07, and .18). The FCP analysis suggested that extrinsic satisfaction was the primary source of influence ($\chi^2 = 19.87, p < .01$). Furthermore, the direction of the influence of extrinsic satisfaction was to increase the correlation, and it did so to a significantly greater degree than did supervisory performance rating ($\chi^2 = 17.02, p < .01$).

The Table 2D data further support Hypothesis 3. Extrinsic satisfaction can be inferred as being causally related to cost performance. The relatively strong cross-lagged correlations are .47, .45, and .46 for the three time periods; all $ps < .01$. The FCP analysis suggests that extrinsic satisfaction was the primary source of influence ($\chi^2 = 21.31, p < .01$) and also increased the correlation ($\chi^2 = 20.68, p < .01$). Therefore, the data shown in Table 2B and 2D support Hypothesis 3.

DISCUSSION

Although a limited number of organizational researchers have used cross-lagged techniques (Greene, 1973; Sheridan & Slocum, 1975; Wanous, 1974) to examine performance-satisfaction relationships among employees, it was felt that some improvement in knowledge might be made by using the corrected cross-lag correlation technique and FCP analysis. Using theoretical and methodological procedures (Baird, 1976; Feldman, 1975; Kenny, 1975; Yee & Gage, 1968), a more comprehensive analysis was designed. It examined supervisory ratings, included a cost performance index, and determined intrinsic and extrinsic job satisfaction for jobs categorized as high in task stimulation and as low in task stimulation.

In searching for feasible explanations for the findings, a number of factors were considered. First, the control systems used in the organization for high and low stimulation jobs were analyzed. The company appeared to utilize what is referred to as output control mechanisms for all engineering jobs (Ouchi, 1977). Upper level management assumed that the

TABLE 2
Causal Analysis of Performance and Satisfaction Variables
For Government Contract Engineers: Low Stimulation Job Category

Time Period	Corrected Cross-Lagged Coefficients	Static Coefficients	Dynamic Coefficients	FCP Tests (1)	FCP Tests (2)
A. Supervisory Performance Rating (S) and Intrinsic Satisfaction (I)					
t_1 and t_2	$rS_1I_2 = .15$ $rI_1S_2 = .18$	$rS_1I_1 = .18$ $rS_2I_1 = .25^*$	$r\Delta S_1 - S_1\Delta I_1 - I_1 = .20$	2.07	2.00
t_2 and t_3	$rS_2I_3 = .09$ $rI_2S_3 = .14$	$rS_3I_2 = .25^*$ $rI_3S_2 = .26^*$	$r\Delta S_2 - S_2\Delta I_2 - I_2 = .29^*$	2.19	2.14
t_1 and t_3	$rS_1I_3 = .13$ $rI_1S_3 = .16$	$rS_3I_1 = .18$ $rS_1I_3 = .26^*$	$r\Delta S_1 - S_1\Delta I_1 - I_1 = .25^*$	2.96	2.12
B. Supervisory Performance Rating (S) and Extrinsic Satisfaction (E)					
t_1 and t_2	$rS_1E_2 = .09$ $rE_1S_2 = .51^{**}$	$rS_1E_1 = .17$ $rS_2E_1 = .24^*$	$r\Delta S_1 - S_1\Delta E_1 - E_1 = .50^{**}$	19.87**	17.02**
t_2 and t_3	$rS_2E_3 = .07$ $rE_2S_3 = .54^{**}$	$rS_3E_2 = .24^*$ $rS_1E_3 = .30^*$	$r\Delta S_2 - S_2\Delta E_2 - E_2 = .58^{**}$	19.23**	19.19**
t_1 and t_3	$rS_1E_3 = .18$ $rE_1S_3 = .50^{**}$	$rS_3E_1 = .17$ $rS_1E_3 = .30^*$	$r\Delta S_1 - S_1\Delta E_1 - E_1 = .52^{**}$	22.61**	21.71**
C. Cost Performance Index (C) and Intrinsic Satisfaction (I)					
t_1 and t_2	$rC_1I_2 = .09$ $rI_1C_2 = .07$	$rC_1I_1 = .31^{**}$ $rC_2I_1 = .04$	$r\Delta C_1 - C_1\Delta I_1 - I_1 = .39^{**}$.97	.76
t_2 and t_3	$rC_2I_3 = .13$ $rI_2C_3 = .14$	$rC_3I_2 = .21^*$ $rC_1I_3 = .31^{**}$	$r\Delta C_2 - C_2\Delta I_2 - I_2 = .29^{**}$	2.14	2.07
t_1 and t_3	$rC_1I_3 = .08$ $rI_1C_3 = .19$	$rC_3I_1 = .31^{**}$ $rC_1I_3 = .21^*$	$r\Delta C_1 - C_1\Delta I_1 - I_1 = .37^{**}$	1.96	1.42
D. Cost Performance Index (C) and Extrinsic Satisfaction (E)					
t_1 and t_2	$rC_1E_2 = .13$ $rE_1C_2 = .47^{**}$	$rC_1E_1 = .07$ $rC_2E_1 = .22^*$	$r\Delta C_1 - C_1\Delta E_1 - E_1 = .57^{**}$	21.31**	20.68**
t_2 and t_3	$rC_2E_3 = .19$ $rE_2C_3 = .45^{**}$	$rC_3E_2 = .22^*$ $rC_1E_3 = .30^*$	$r\Delta C_2 - C_2\Delta E_2 - E_2 = .53^{**}$	19.78**	19.35**
t_1 and t_3	$rC_1E_3 = .11$ $rE_1C_3 = .46^{**}$	$rC_3E_1 = .07$ $rC_1E_3 = .30^*$	$r\Delta C_1 - C_1\Delta E_1 - E_1 = .59^{**}$	18.71**	18.61**

* $p < .05$ ** $p < .01$

measures of desired results used for engineering projects were reliable and valid. The task assignments for power plant and government contract projects also were examined thoroughly. The major difference in the tasks involved the customers or clients with whom the engineers interacted. In the case of the power plant engineers, the clients were industrial managers; contract engineers worked with government personnel. The nature of the task array for both types of engineering jobs involved responsibility for cost control, scheduling of work, developing subordinates, preparing internal reports, and handling grievances from clients. In fact, the four observers discussed earlier concluded that the major differences in the jobs of power plant and government contract engineers was not the responsibilities, but seemed to be the nature of the job stimulation. Finally, the pay systems, vacation policies, and promotion opportunities were examined. Once again, no significant differences existed across the two types of engineering jobs.

An explanation regarding the initial intrinsic satisfaction and subsequent performance rating and cost performance results is tentative at best. The results may be explained in terms of trade-offs between satisfaction and performance. For example, a two-phase research project investigated the effects of job enrichment and goal setting on performance and satisfaction (Umstot, Bell, & Mitchell, 1976). Another study investigated intrinsic and extrinsic expectancies as causes of satisfaction and performance (Sims, 1976). Both studies showed that intrinsic factors predicted satisfaction, but extrinsic contingencies predicted performance. Perhaps these results can be used to speculate about engineers in the high stimulation jobs. These engineers may be deriving the intrinsically based rewards of the job and not addressing the control and planning work activities. In other words, if the most important parts of a job are the dull, mundane, routine tasks, then "enriching" it with more interesting and challenging tasks may force a trade-off between satisfaction and performance. This type of trade-off could occur indefinitely unless management is able to use enriching tasks as rewards contingent on accomplishing the dull but necessary tasks.

The results may indicate that the engineers with high stimulation jobs may be allowed by the present system in the company to direct most attention and energy to what are considered the exciting or stimulating aspects of the job. Unfortunately, this behavior could be resulting in lower performance ratings and higher performance costs because the dull job tasks are being neglected. It could be speculated that the initial satisfaction and subsequently lower performance ratings and higher performance costs exhibited by the high stimulation job occupants would continue because of the use of a noncontingent reward system. This explanation of the results necessarily must be treated with extreme caution. It was not determined whether dull, mundane, and routine tasks were considered important and necessary by either the engineers or their supervisors. Further, the degree

of effort and attention expended by engineers toward the stimulating aspects of the job was not assessed.

In general, jobs that have low task stimulation characteristics are considered to have low potential for satisfying higher order needs (Hackman, 1977). Job monotony, lack of variety, and low autonomy characteristics are associated more with low task stimulation jobs than with high task stimulation jobs. The government contract engineers were observed to be working on jobs with low task stimulation potential. The results indicate that engineers on the low task stimulation jobs who are extrinsically satisfied apparently are subsequently performing more effectively. This finding supports the contention that a satisfied employee is a better performer. Perhaps the engineers on the low task stimulation jobs wanted to "look good" to supervisors so that more stimulating projects could be secured in the future.

The present study results have several important implications for top-level decision makers. First, the engineers working on the two types of jobs, high stimulation and low stimulation, respond differently to intrinsic and extrinsic satisfaction. The relationship between performance and satisfaction should be weighed on the basis of the degree of task stimulation and the form of satisfaction available to job occupants. The unexpected causal relationship between intrinsic satisfaction and performance for engineers on high task stimulation jobs needs to be analyzed further. Negative reciprocation can be a significantly dysfunctional consequence in any organizational setting. Second, the manager whose objective is to improve the performance of engineers on low stimulation projects will not be able to achieve the goal by simply increasing the intrinsic characteristics of the job. In fact, both the supervisory performance rating and the cost performance index are affected more significantly by extrinsic satisfaction. Finally, to assume that the two types of engineering projects being worked on are equivalent to each other or offer equally high task stimulation opportunities appears to be unwarranted. It would appear to be inaccurate to conclude that the task stimulation qualities of the power plant and the government contract projects are similar.

The results and discussion indicate that there is no correct way to state the performance-satisfaction relationship for high and low task stimulation jobs for engineers. As some of the data in Tables 1 and 2 suggest, at times there is a fairly strong relationship; at other times there is no meaningful relationship at all. However, the results are sufficient to recommend that it is worthwhile to categorize jobs on the basis of task stimulation potential to examine the performance-satisfaction causal relationship.

Although recent methodological procedures were incorporated in the present study, caution must be exercised in generalizing the results to other samples, jobs, and organizations. These results could be influenced by the type of jobs, the positive growth environment of the company, and the reward systems used. These and other factors certainly could account for some of the findings. Remember that the analytical procedures used only

allow the researcher or manager to make inferences about cause and effect.

However, the limitations of using a passive quasi-experimental design do not detract from the findings regarding the importance of examining the task stimulation potential of jobs. There is a need for more research that considers different jobs, samples, time lags, and measures of performance and satisfaction. Through additional and more rigorous research efforts, better insight into the intricate relationship between performance and satisfaction can be provided.

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Social Systems Structure, Job Design, and Growth Need Strength: A Test of a Congruency Model¹

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An eight cell congruency framework for social system structure (mechanistic-organic), job design (simple-complex), and employee growth need strength (low-high) was used to predict employee satisfaction, motivation, and performance. As expected, employee satisfaction was highest for persons in the organic-complex-high condition. Two way interaction effects (social system structure \times job design and job design \times growth need strength) also were found to be significant.

Initial steps toward a conceptual integration of the organization structure and job design literatures have appeared recently. Morse and Lorsch (1970), Lawler (1971), Nemiroff and Ford (1975, 1976), and Porter, Lawler, and Hackman (1975) all have offered congruency models. Each of these models suggests that the attainment of individual and organizational outcomes is contingent upon either an organization-job design fit or an organization-job design-individual fit. Morse and Lorsch (1970) argued that employee competence motivation and unit performance should be highest when there is an organization-job design congruence. Nemiroff and Ford's (1975, 1976) model emphasizes that job effectiveness and human fulfillment are contingent upon an organization structure-job

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design-individual fit. Lawler (1971) and Porter et al. (1975) predicted highest performance and satisfaction under conditions where organic organization design, enlarged jobs, and employees with high growth need strength converge.

CONCEPTUAL INTEGRATION

Porter, Lawler, and Hackman

Porter et al. (1975) provided a conceptual integration of organization (social system) design, job design, and employee characteristics. They placed organization design on a continuum ranging from the classical Weberian bureaucratic (mechanistic) model to an organic social system design. Job design was placed on a continuum ranging from simple to complex. The third dimension in the conceptual paradigm is employee growth need strength, an individual difference variable. This construct refers to the extent to which an employee desires or values the intrinsic qualities inherent in complex job designs.

Porter et al. defined eight cells (a $2 \times 2 \times 2$ model) by dichotomizing and crossing the three constructs (mechanistic-organic organization design, simple-complex job design, and low-high employee growth need strength) and predicted worker responses under each of the eight conditions. These predictions were based on a congruency concept in which job satisfaction and worker performance should vary as a function of the congruence between the organization, job design, and individual characteristics. Porter et al. predicted (see Table 1) that the three "effects" will interact such that the highest levels of satisfaction and performance should be observed under the two completely congruent conditions: organic design, complex jobs, and high growth needs; and mechanistic design,

TABLE 1
Predictions

<i>Cell Number in Porter et al.</i>	<i>Social System Structure</i>	<i>Job Design</i>	<i>Growth Need Level</i>	<i>Predicted Level of Satisfaction and Performance</i>	<i>Rank Order Predicted by Porter et al.</i>	<i>Rank Order Predicted by Pierce, Dunham, and Blackburn</i>
7	Organic	Complex	High	Highest	1	1
2	Mechanistic	Simple	Low	High	2	7
5	Organic	Simple	High	Intermediate	4.5	5
3	Mechanistic	Complex	High	Intermediate	4.5	2
6	Organic	Simple	Low	Intermediate	4.5	6
4	Mechanistic	Complex	Low	Intermediate	4.5	4
8	Organic	Complex	Low	Lowest	7	3
1	Mechanistic	Simple	High	Lowest	8	8

simple jobs, and low growth needs. Expectations for performance and satisfaction were somewhat higher for the former congruent case. It also was predicted that the lowest levels of satisfaction and performance should be found for persons who experience both organizational and job designs that are incongruent with their growth needs, i.e., in situations where organic design, complex jobs, and low growth needs converge and/or where mechanistic design, simple jobs, and high growth needs converge. Finally, it was implied that the four remaining cells should produce intermediate levels of satisfaction and performance.

A reading of the current job design literature (Pierce & Dunham, 1976) has led the present authors to a set of predictions that are somewhat at variance with those of Porter et al. We are in agreement with Porter et al. in our predictions of the best and worst combinations. It seems clear that the most positive worker responses should be observed in a condition in which persons with high growth need strength experience both a complex job and an organic social system structure. It also appears likely that the least favorable worker responses should be found when high growth need individuals experience both a job and a social system (simple/mechanistic) that are counter to their preference (i.e., incongruent with their needs). Several of our remaining predictions, however, are different than those of Porter et al.

There are two reasons why our remaining predictions vary from those of Porter et al. The first is based on the empirical evidence concerning the role of growth need strength as a moderator of job design—response relationships. This evidence clearly shows significant positive relationships between job design and work responses for both high and low growth need persons. Frequently the moderating effects that have been identified suggest that there is a stronger positive relationship for high growth need persons. Yet, the exact nature of the moderating effects of individual differences remains unclear (Stone, 1976; White, 1978). It is predicted that both high and low growth need workers should react favorably when presented with either a complex job or an organic social system and most favorably when presented with both.

The second reason why our predictions vary from those of Porter et al. concerns our feeling that the design of the job is of more importance to workers than the design of the social system. This is based on the fact that the job is closer to the worker and is experienced on a more regular and personal basis than is the organizational or social system design. Thus, workers should be expected to react more favorably to a complex/mechanistic situation than to one which is simple/organic. The present authors feel that social system design is of secondary importance to job design as a determinant of worker responses. For those reasons the following sets of rank orderings for worker responses are predicted (1 is most positive):

High Growth Needs	Low Growth Needs
1. complex/organic	1. complex/organic
2. complex/mechanistic	2. complex/mechanistic
3. simple/organic	3. simple/organic
4. simple/mechanistic	4. simple/mechanistic

Given the assumptions presented above, an integration of these two sets of predictions leads to the eight predictions presented in the last column of Table 1.

There is one caveat that should be expressed at this point. The predictions made in the present paper are based on the empirical literature, which has dealt primarily with employee affective responses. It is possible that productivity would at times be more heavily influenced by the congruency of job and social system design than would affective responses. If this is the case, the order of our mid-range predictions for noncongruent, job-social system matches may need to be modified when the dependent variable is productivity.

Confirmation of the predictions made by Porter et al. or by the present authors would have major consequences. A documentation of interactions between social system design, job design, and employee characteristics would render deficient the more simplistic models dealing with these constructs. Future research, personnel placement, structure design, and job engineering would become increasingly complex activities if interactions exist.

Other Models

The congruency predictions of Porter et al. have many similarities to those from other congruency models. For example, Morse and Lorsch (1970) focused on unit performance and employee competency motivation and examined the structure and job design of four organizational units—two congruent and two incongruent combinations. It was reported that performance and employee motivation were higher in the mechanistic organization with simple jobs and in the organic organization with enlarged jobs than in the two units with incongruent organization-job combinations.

The Nemiroff and Ford (1975, 1976) model, like that of Porter et al., deals with a three-way fit between organization design, job design, and employee values in terms of organizational effectiveness and human fulfillment. Some support for this congruency model was provided in an examination of simple-complex jobs, mechanistic-organic organization design (operationalized in terms of leader behavior: impersonal-flexible), and employee bureaucratic orientation and higher order need strength. Individuals with low growth need strength and bureaucratic orientation on simple jobs in mechanistic structures experienced more fulfillment than did individuals with high growth need strength and low bureaucratic orientations.

The research reported in the present paper tested predictions similar to those made by Porter et al. (1975). This study examined the main and interaction effects of three independent variables: social system design (mechanistic-organic) operationalized at the work unit level; job design (simple-complex); and growth need strength (low-high). The research design includes a multivariate network of nine dependent variables (employee responses) that are central to the predictions made by Porter et al.

STUDY METHOD

Subjects and Data Collection

Data were obtained from 398 employees in the home office of a 5,000 employee insurance company. Of the employees asked to participate in the study, 90 percent volunteered to do so. The survey was administered on job release time by the first author. Respondents were drawn from 19 distinct work units taken from vertical and horizontal slices of the organization hierarchy. The employees provided either their name or employee number so that data collected from company records and supervisors could be matched with employee responses. The respondents were assured that their responses would remain confidential. To obtain an indication of test-retest reliability, an additional 30 employees from three additional work units within the same home office completed the employee questionnaire twice at a one-month time interval. Supervisors of the 19 work units completed their retest questionnaire 14 weeks after the initial administration.

Measures and Variable Definitions

Social System Design—In this study the mechanistic-organic model of social system design is patterned in large part after Hage's (1965) structural paradigm. According to Hage, the mechanistic organization has low complexity and high levels of centralization, formalization, and stratification. The organic system is said to be complex with low levels of centralization, formalization, and stratification. The works of Burns and Stalker (1961), Hage (1974), and Van de Ven, Delbecq and Koenig (1976) suggest that impersonal coordination characterizes the mechanistic organization, and group or collegial efforts typify coordination in organic social systems.

Organizational analysis has increasingly examined the structural properties of subcomponents (e.g., work units) of the focal organization (Litwak, 1961; Hall, 1963; Porter & Lawler, 1965; Lawrence & Lorsch, 1967; Morse & Lorsch, 1970). Conceptual (Litwak, 1961; Van de Ven, 1976) and empirical (Hall, 1963; Lawrence & Lorsch, 1967, Van de Ven & Delbecq, 1974) evidence suggests that (a) work units can be defined as

having a multidimensional social system profile, (b) the structural variation of organizational work units can range from mechanistic to organic, and (c) structural measurement of work unit design should follow traditional approaches to organizational measurement.

In the present investigation the work unit (i.e., a supervisor and his/her span of nonsupervisory personnel) was employed as the unit of analysis for social system design, allowing the examination of 19 organizational units. Five work unit variables were measured, with the data coming from multiple sources: company records, work unit supervisors, and work unit employees. Work unit complexity was represented by the number of distinct job titles in the work unit (Hage, 1974) standardized by work unit size (company records). Centralization was measured by an index of participation in work unit based decisions—aggregated employee responses (Aiken & Hage, 1968). Formalization referred to the extent to which work unit norms (rules, policies, and procedures) were codified and expressed in written form for the employees (unit supervisors). Stratification was operationalized in terms of the salary/income differential (range) between the highest and lowest paid work unit members (company records) (Hage, 1965). Finally, coordination referred to the extent to which workers and work activities were coordinated by predetermined plans versus committees or problem solving groups (unit supervisors) (Van de Ven et al., 1976).

To classify each work unit as either mechanistic or organic, the scores on each of the organization variables were standardized and combined in a unit weight linear model. The resulting distribution was dichotomized, classifying 6 work units with 236 employees as mechanistic and 13 work units with 162 employees as organic. It could be argued that a simple dichotomization would lead to confounding effects due to a somewhat unclear break between high and low classifications. To evaluate the impact of this problem, high and low groups on each of the three variables in this study (social system, job, and person) were formed, excluding a middle group who might be considered borderline members in either group. All analyses presented in this report also were conducted with grouping done on this basis ($n = 254$). Results indicated that the interpretation was not substantively different under the two procedures. Because of this, the results based on the total sample are reported here.

Job Design—Job design was operationalized by administering the Hackman and Oldham (1975) Job Diagnostic Survey (JDS). The JDS was designed to measure employees' perceptions of the amount of variety, autonomy, identity, significance, and task feedback associated with their jobs. To classify each person's job as either simple or complex, a simple linear combination of the 15-item, 5-point scale model was used. This approach has been suggested by Brief, Wallace, and Aldag (1976); Dunham (1976); and Pierce and Dunham (1976). The resulting distribution was examined and dichotomized with 161 positions classified as simple and 237 positions classified as complex.

Growth Need Strength—The JDS ("would like" format) was employed to obtain measures of growth need strength (GNS). The simple linear combination of the six items was dichotomized leading to the classification of 168 employees as having relatively low growth need strength and 230 employees as having high growth need strength.

Employee Responses—The Index of Organizational Reactions (IOR) (Smith, 1976; Dunham, Smith, & Blackburn, 1977) was used to measure employees' work satisfaction and company identification satisfaction. The short form of the Minnesota Satisfaction Questionnaire (MSQ) (Weiss, Dawis, England, & Lofquist, 1967) was used to measure intrinsic and extrinsic satisfaction. Internal motivation was measured using the Hackman and Oldham (1975) instrument. The Lawler and Hall (1970) adaptation of a Lodahl and Kejner (1965) instrument was used to measure job involvement. Effort was measured by employee response to a 5-point (well below average to well above average) scale. In addition, each supervisor evaluated their employees in terms of effort and performance level. In making ratings, supervisors were instructed to use the same 5-point scale (well below average to well above average) and to rate an equal number of employees as above and below average relative to their fellow workers.

Validity of Self-Report Measures

Employee self-report measurement techniques were used to assess the job design, centralization, growth need strength, and satisfaction constructs. Factor analyses were used to demonstrate the discriminant validity for these four sets of measures. The following summarizes the results of these principal component factor analyses based on item responses. Oblique rotations were used in each case.

1. The 6 GNS items and 6 IOR types of work satisfaction items produced a very clean two factor solution matching the a priori scales.
2. The 6 GNS items and 15 JDS items defined four job design factors and one GNS factor with no cross-loadings greater than .15.
3. The 6 GNS items and 20 MSQ general satisfaction items identified four satisfaction factors and one GNS factor with no cross-loadings greater than .13.
4. The 15 JDS items and 6 IOR work satisfaction items produced four job design factors and one satisfaction factor with .25 being the largest cross-loading.
5. The 15 JDS items and 12 MSQ intrinsic satisfaction items also defined empirically distinct factors with only three cross-loadings above .30 (.33, .34, .35).
6. The 15 JDS items and 6 MSQ extrinsic satisfaction items identified four job design factors and one satisfaction factor with the largest cross-loading being .17.
7. Centralization, the only employee self-report measure of a social system attribute, and the job design measures also were factor

analyzed. The resulting factor structure identified four job design factors and one centralization factor with three of the 12 centralization items loading on the autonomy factor as well as on the centralization factor. The highest cross-loading of job design items on the centralization factor was .13.

Table 2 shows the intercorrelations for the employee responses, growth need strength, organic-mechanistic social system design, and the job design variables. It is clear that the three independent variables in this study exhibit a high degree of independence. In light of the factor structures discussed above and the relevant organization and job design literature, the total pattern of intercorrelations is not surprising. Employee

TABLE 2
Intercorrelations^a

	1	2	3	4	5	6	7	8	9	10	11	12
1. Organic-mechanistic	-											
2. Simple-complex	.22	-										
3. Growth need strength	.15	.29	-									
4. Internal motivation	.07	.38	.18	-								
5. Job involvement	.16	.39	.22	.31	-							
6. Kind of work satisfaction	.17	.62	.10	.49	.50	-						
7. Company identification satisfaction	.12	.35	.02	.32	.36	.54	-					
8. Performance-supervisor	.00	.20	.06	.14	.21	.24	.04	-				
9. Effort-supervisor	.05	.20	.09	.16	.26	.27	.09	.79	-			
10. Intrinsic satisfaction	.24	.66	.05	.43	.44	.77	.54	.19	.22	-		
11. Extrinsic satisfaction	.18	.43	-.05	.32	.30	.58	.62	.06	.12	.67	-	
12. Effort-self	.00	.17	.28	.20	.27	.23	.22	.18	.17	.18	.06	-

^aDecimals have been omitted.

$r > .09, p < .05$

$r > .12, p < .01$

growth need strength has relatively weak zero-order correlations, accounting for small levels of variance in the other variables. The strong job design correlations with the satisfaction variables are consistent with the job design literature (Pierce & Dunham, 1976), and the intercorrelations of job design with the social system variable show only small portions of shared variance. The correlations for the supervisor supplied measures of social system formalization and coordination and of employee effort and performance range from .07 to .04.

Thus, reasonable discriminant validity evidence is demonstrated for these sets of measures. Even though a common measurement method is

employed for a number of the variables, the factor analyses and intercorrelations indicate that the four sets of measures are assessing relatively distinct, albeit interrelated, constructs.

ANALYTICAL DESIGN

Two analytical models were employed to examine the social system structure, job design, and GNS congruency framework. First, following the Porter et al. (1975) predictions, a $2 \times 2 \times 2$ multivariate analysis of variance (MANOVA) was used. This multivariate approach allows a test of the various "work outcomes" as a general class of responses as presented by Porter et al. As an aid in the interpretation of the MANOVA model, an eight group discriminant function analysis was also employed.

The three way classification of the independent variables yielded reasonable sample sizes for each of the eight cells (see Table 3). The authors, however, agree with the statement that "the 'type' of people, organizational designs, and job designs presented... are to some extent caricatures of the real world: pure types of any of the three simply do not exist. It is more useful and valid to think of the cells... as end points on a continuum rather than as meaningful types in themselves" (Porter et al., 1975, p. 310). Given this consideration, cross product terms were added in a canonical correlation analysis (Cooley & Lohnes, 1971; Dunham & Kravetz, 1975) to predict the nine worker responses. That is, the seven "effects" included in the MANOVA model (3 main, 3 two way and 1 three way interaction) were used to predict variance in the employee responses. This approach removes the restrictions of dichotomization and allows the use of the full range of each variable and an examination of the full impact of each interaction term.

RESULTS

Table 3 presents the means and standard deviations for the independent and dependent variables. This table also presents the sample sizes and variable means for each of the eight cells. Table 4 shows the reliability estimates (internal consistency examined via coefficient alpha and the test-retest stability coefficient) for the variables included in the investigation.

Table 5 provides the summary statistics for the MANOVA and the discriminant function analysis. This summary shows that three main effects (social system structure, job design, and individual differences) were statistically significant ($p < .05$). Significant main effects for the social system structure and job design variables are consistent with the current literature (e.g., Porter & Lawler, 1965; Berger & Cummings, 1979; Pierce & Dunham, 1976). Although the MANOVA analysis shows significant main effects for growth need strength, there is no current theoretical explanation for this relationship. It should be noted that the zero-order

TABLE 3
Descriptive Statistics for All Variables

Variable	Overall Mean	Standard Deviation	Subgroup Means											
			Organic Complex High	Mechanistic Simple Low	Organic Simple High	Mechanistic Complex High	Organic Simple Low	Mechanistic Complex Low	Organic Complex Low	Mechanistic Simple High				
Kind of work satisfaction	3.37	.93	3.89	3.01	2.63	3.81	2.90	3.55	3.69	2.60				
Intrinsic satisfaction	3.66	.69	4.11	3.33	3.15	3.94	3.37	3.76	4.06	2.99				
Extrinsic satisfaction	2.89	.93	3.26	2.77	2.36	3.12	2.50	3.03	3.16	2.28				
Company identification satisfaction	3.38	.69	3.62	3.25	3.30	3.53	3.22	3.46	3.52	3.11				
Intrinsic motivation	4.20	.61	4.50	4.07	3.94	4.35	3.89	4.29	4.15	3.98				
Job involvement	2.53	.70	2.87	2.17	2.31	2.78	2.28	2.45	2.72	2.25				
Effort (self-report)	3.75	.75	3.89	3.41	3.83	3.99	3.70	3.64	3.48	3.79				
Effort (supervisor report)	3.10	1.12	3.24	2.74	3.20	3.43	3.12	3.06	3.23	2.38				
Performance	3.12	1.17	3.16	2.87	3.20	3.39	2.94	3.18	3.26	2.62				
Organization design	0.08	3.21	3.99	-2.16	1.63	-1.73	1.61	-1.74	3.09	-2.38				
Job design	4.81	1.19	5.61	3.51	3.58	5.48	3.52	5.26	5.26	3.71				
Growth need strength	5.75	1.14	6.55	4.42	6.51	6.44	4.50	4.95	5.16	6.45				
Sample size	398	398	63	54	35	93	33	50	31	39				

TABLE 4
Reliability Estimates*

<i>Variable</i>	<i>No. of Items</i>	<i>Coefficient Alpha</i>	<i>Test-Retest</i>
<i>Social system</i>			
Centralization	12	.90	.92
Formalization	4	.74	.85
Complexity	1	N.A.	No change across the 14 weeks
Stratification	1	N.A.	No change across the 14 weeks
Coordination-impersonal group	2 3	.73 .79	.79 .73
<i>Job design</i>			
Autonomy	3	.78	.81
Identity	3	.60	.72
Variety	3	.79	.86
Significance	3	.65	.65
Feedback	3	.75	.64
<i>Individual difference</i>			
Growth need strength	6	.86	.68
<i>Employee responses</i>			
Intrinsic motivation	4	.73	.79
Job involvement	5	.76	.84
Kind of work satisfaction	6	.91	.90
Company identification	5	.85	.71
Performance—supervisor	1	N.A.	D.N.C.
Effort—supervisor	1	N.A.	D.N.C.
Effort—self	1	N.A.	.49
Intrinsic satisfaction	12	.88	.50
Extrinsic satisfaction	6	.84	.63

*N.A. = not applicable; D.N.C. = data not collected.

TABLE 5
Multivariate and Discriminant Function Analysis

<i>MANOVA Summary Factor</i>	<i>F</i>	<i>d.f.</i>	<i>p <</i>
1. Social system structure	2.20	9,382	.02
2. Job design	21.49	9,382	.00
3. Growth need strength (GNS)	3.31	9,382	.00
4. Social system structure \times job design	1.93	9,382	.05
5. Social system structure \times GNS	0.84	9,382	.58
6. Job design \times GNS	2.00	9,382	.04
7. Social system structure \times job design \times GNS	0.81	9,382	.61
Discriminant function analysis summary:			
	χ^2	<i>d.f.</i>	<i>p <</i>
Function 1	174.0	15	.00
Function 2	34.9	13	.00
Function 3	23.3	11	.02

correlations between GNS and employee responses range from $r = .01$ to $r = .28$ and account for only small amounts of the criterion variance.

The job design \times social system structure and job design \times growth need strength interactions also produced significant effects. The former interaction represents a relatively untested but very important relationship; the

latter interaction effect is consistent with much of the current job design literature (see Pierce & Dunham, 1976). The Porter et al. framework suggests that there should be a significant three way interaction. The data analyzed by this technique fail to identify a significant social system structure \times job design \times growth need strength interaction effect.

The eight-group discriminant function analysis identified three significant functions (i.e., three independent linear combinations) that significantly discriminate between the eight groups and account for 43 percent of the total discriminant variance. These functions may be interpreted by referring to the structure matrix shown in Table 6. The structure matrix presents the correlations between the variables and the discriminant functions (linear combinations). Table 7 presents the eight-group centroids on the three functions that are necessary for evaluating the Porter et al. (1975) predictions for satisfaction, motivation, and performance.

TABLE 6
Structure Matrix
Eight-Group Discriminant Function Analysis*

<i>Variable</i>	<i>Function 1</i>	<i>Function 2</i>	<i>Function 3</i>
Kind of work satisfaction	.88	-.08	.28
Intrinsic satisfaction	.94	-.09	-.04
Extrinsic satisfaction	.60	-.26	.18
Company identification satisfaction	.46	-.10	.17
Intrinsic motivation	.49	.05	.61
Job involvement	.59	.39	.14
Effort (self-report)	.17	.81	.30
Effort (supervisor report)	.36	.35	-.42
Performance	.26	.18	-.19

*Multivariate $\omega^2 = .43$

TABLE 7
Group Centroids From Eight-Group Discriminant Function Analysis

<i>Cell Number in Porter, Lawler, & Hackman (1975)</i>	<i>Group</i>			<i>Function</i>		
	<i>Social System Structure</i>	<i>Job Design</i>	<i>Growth Need Strength</i>	<i>1</i>	<i>2</i>	<i>3</i>
7	Organic	Complex	High	5.44	3.24	2.33
2	Mechanistic	Simple	Low	4.23	2.71	2.27
5	Organic	Simple	High	4.01	3.55	2.01
3	Mechanistic	Complex	High	5.23	3.38	2.27
6	Organic	Simple	Low	4.31	3.29	1.82
4	Mechanistic	Complex	Low	4.90	2.87	2.29
8	Organic	Complex	Low	5.32	2.82	1.85
1	Mechanistic	Simple	High	3.75	3.31	2.49

Function one is represented primarily by the satisfaction variables, especially intrinsic satisfaction and kind of work satisfaction (each has a correlation with the first function in excess of $r = .85$). Function two is

predominantly represented by the self-rating of effort expended on job performance. Function three is defined by intrinsic motivation with the supervisor rating of employee effort having a moderate impact.

Removing the restrictions imposed by dichotomization and allowing the full range of each of the three independent variables to impact on the dependent variables, two canonical correlation analyses were conducted, each of which produced three significant ($p < .05$) canonical correlations. In the first analysis, the three independent variables were used to predict the criterion set composed of the nine dependent variables. In the second canonical analysis, the same criterion set was employed and the predictor set was composed of the three independent variables plus cross-product terms representing the four possible interactions. The results of the two analyses were so similar that only the latter will be reported in detail.

The variance matrix (see Table 8) presents the squares of the correlations between each of the individual variables and each of the canonical variates (see Dunham & Kravetz, 1975). This table can be used to interpret the three significant multivariate relationships identified by the canonical analysis. The total redundancy index ($\bar{R}^2 = .21$) in Table 8 shows that the three main effects plus the four interaction effects accounted for an average of 21 percent of the employee response variance (the three main effects alone accounted for 18 percent). The table also shows (see the R^2

TABLE 8
Variance Matrix from Canonical Analysis^a

	<i>Criterion Variates</i>			<i>Predictor Variates</i>			<i>R²</i>
	<i>I</i>	<i>II</i>	<i>III</i>	<i>I</i>	<i>II</i>	<i>III</i>	
<i>Criterion variables</i>							
Kind of work satisfaction	79	02	00	41	00	00	41
Intrinsic satisfaction	94	01	00	49	00	00	49
Extrinsic satisfaction	42	08	01	22	01	00	23
Company identification satisfaction	25	00	05	13	00	00	13
Intrinsic motivation	24	13	28	12	02	02	16
Job involvement	27	24	00	14	04	00	18
Effort (self-report)	03	56	00	02	08	00	10
Effort (supervisor report)	08	10	50	04	01	03	08
Performance	08	05	45	04	01	03	08
<i>Predictor variables</i>							
Social system structure	05	00	00	10	01	00	
Job design (complexity)	48	00	00	92	04	01	
Growth need strength	00	12	00	01	83	03	
Social system structure \times job design	05	00	00	10	01	02	
Social system structure \times growth need strength	06	00	00	11	03	00	
Job design \times growth need strength	29	01	00	56	37	03	
Social system structure \times job design \times growth need strength	05	00	00	10	02	05	
Eigenvalues	52	15	06	52	15	06	

^aUnderlined entries had negative loadings in the structure matrix. Decimals have been omitted.

estimates) that the seven predictors accounted for 49 percent of the intrinsic satisfaction and 41 percent of the kind of work satisfaction variance. Considerably less variance was explained for each of the other employee response variables, although a minimum of 8 percent of the variance was explained for each of the employee response variables.

Further examination of the variance matrix reveals that the first canonical variate established a multivariate relationship in which job complexity and the job complexity \times growth need strength interaction were the predominant predictors of intrinsic and kind of work satisfaction. In fact, only this first variate accounted for any variance in these two work related satisfaction variables.

Effort (self-report) was the major variable being predicted in the second canonical variate. Growth need strength and the job design \times growth need strength interaction served as the primary predictors. This was the only variate on which growth need strength played any main effect role.

The third significant canonical variate was rather complex. This variate established a relationship in which small amounts of the supervisor's ratings of effort and performance plus a small amount of intrinsic motivation are predicted. The only predictor variables that did not contribute were the social system structure main effects and the social system structure \times growth need strength interaction effect. The strongest predictor was the variable representing the three way interaction between social system structure, job design, and employee growth need strength (the statistical significance of this effect cannot be determined).

DISCUSSION

Evaluation of the Porter et al. Predictions

Porter et al. (1975) predicted that the "congruent" cell (i.e., cell 7) represented by an organic social system, complex job design, and high growth need strength would have the highest satisfaction scores, followed closely by the second congruent combination (cell 2) (i.e., mechanistic social unit, simple job design, and low growth need strength). The former prediction was confirmed as shown by the group centroids (see Table 7) for function 1, which was dominated by satisfaction variables. The prediction for the second congruent cell was not confirmed. This group centroid (mechanistic-simple-low) was considerably lower than that of cell 7 and, in fact, ranked sixth among the eight groups on function 1.

It was also predicted that the lowest levels of satisfaction would exist for employees who experience both social system structures and job designs that are incongruent with their growth need strength. That is, those employees with low growth needs, in organic social systems, on complex jobs (cell 8) and the persons with high growth need strength experiencing mechanistic social systems and simple jobs (cell 1) should have the lowest levels of satisfaction. The Porter et al. prediction was accurate for cell 1

(mechanistic-simple-high) but was quite inaccurate for cell 8 (organic-complex-low). The group centroid for cell 1 ranked lowest on function 1, and the satisfaction score for cell 8 ranked second among the eight groups. Regardless of GNS, satisfaction was highest when there was exposure to an organic social system and complex job design (cells 7 and 8), followed by exposure to complex jobs given a mechanistic work design (cells 3 and 4). The lowest level of satisfaction was found for the high GNS employees on simple job designs in mechanistic work units, as predicted.

An interesting set of findings on the first discriminant function involves the four groups (cells 3 to 6) that were predicted to fall together between the two pairs of high and low cells. Porter et al. implied that these four groups should be approximately equal to one another in terms of worker responses. In the present study, however, Mahalanobis D^2 (1936) comparisons demonstrated that these groups varied significantly from one another. It appears as though low growth need strength employees responded more to congruence with social system structure (cell 4) than with job design (cell 6) and that the high growth need strength employees responded more to congruence with job design (cell 3) than with the structure of the social unit (cell 5).

It could be argued that the high satisfaction found in the congruent (organic-complex-high) and the incongruent (organic-complex-low) cells was due to a lack of meaningful differences in the sample on growth need strength scores. This conclusion is rejected because the GNS main effect and the job design \times GNS interaction effect suggest that there were meaningful GNS differences across the eight groups.

The results for function 2, defined predominantly by the self-report data of effect, provide an interesting insight. This function (with only one exception) showed that, across social systems type and across job type, employees with high growth need strength reported higher expenditures of effort than did their low GNS counterparts. The third discriminant function (predominantly intrinsic motivation) revealed that in organic social systems, workers have relatively low intrinsic motivation unless they also have a complex job and high growth need strength.

Evaluation of Present Authors' Predictions

The predictions made in this paper by the present authors received considerably more support than did those of Porter et al. Examination of the group centroids from function 1, which was dominated by satisfaction variables, revealed a high degree of correspondence of the empirical rank order to the predicted rank order. In fact, predictions made independently for high and low GNS groups were confirmed exactly. When the two sets of predictions were integrated, three of the rank order predictions were exact, three were underpredicted by one rank, one was overpredicted by one rank, and one group was overpredicted by two ranks. This can be contrasted with the predictions of Porter et al., which were off by as much as

five ranks. It should be noted that all three underpredictions involved low GNS cells and both overpredictions involved high GNS cells, suggesting a possible overemphasis on the importance of GNS in the predictions. It also should be noted that the empirical findings for the second and third discriminant functions conform poorly to both sets of predictions. This could be due to the instability of secondary functions or to the dependent variables involved.

CONCLUSIONS

The present study, an examination of the main and interaction effects of social system (work unit) structure (mechanistic-organic), job design (simple-complex), and employee growth need strength (low-high), was undertaken to compare predictions made by Porter et al. with those made by the present authors. The Porter et al. predictions suggest that the three constructs interact such that employee satisfaction, motivation, and performance should be highest when there is a congruence across the three constructs (e.g., organic-complex-high and mechanistic-simple-low). The lowest levels of satisfaction, motivation, and performance should exist when the employee's growth need strength is incongruent with both social system and job design (organic-complex-low and mechanistic-simple-high).

In an evaluation of the predictions, both MANOVA and moderated canonical regression analyses were performed. In the MANOVA analysis, using nine employee responses as dependent variables, all three main effects (social system structure, job design, and growth need strength) were statistically significant. There also were two significant two way interactions: social system structure \times job design and job design \times growth need strength. The three way interaction failed to produce a significant effect. In this analysis, 43 percent of the total variability of the three discriminant functions was attributable to group differences. The moderated canonical regression analysis accounted for an average of 21 percent of the employee response variance, 49 percent of the variance for intrinsic satisfaction, and 41 percent for kind of work satisfaction. By removing the restrictions imposed by dichotomizing the variables in the subgroup analysis and allowing the full range of each of the three independent variables to be analyzed, a small three way interaction effect also was identified.

Examination of the discriminant function analysis revealed that there were three independent linear combinations (satisfaction, effort, and intrinsic motivation) that allowed discrimination between the eight groups. The group centroids revealed limited support for some of the Porter et al. predictions. Predicted results occurred for the groups which should have had the highest and lowest levels of satisfaction (i.e., the organic-complex-high and mechanistic-simple-high cells, respectively). For the remaining cells, there was relatively little support for the specific predictions

suggested in the Porter et al. framework. There was considerably stronger support, however, for the predictions made by the present authors.

Although the support for the specific Porter et al. predictions was somewhat limited, a number of important findings were obtained. It was shown that the independent variable, job design, had a main effect as well as interaction effects with both GNS and social system structure. This suggests that the full effects of job design cannot be understood without knowledge of both the worker (GNS) and the organization (social system structure). Specific modifications of the Porter et al. model were suggested by the authors and received fairly strong support from the study data. These suggest that the design of the job is more important to workers than is the design of the social system. The findings also confirm that both high and low GNS workers responded more favorably to complex jobs and organic social systems than to simple jobs and mechanistic social systems. If these findings are supported by future research, job design decisions must be made within a model that includes all three variables. In addition, if either individual changes or social system structure changes are to be made in an organization, the potential impact on worker responses to the existing job design must be considered. These findings support the need for a systems congruency framework for understanding and predicting the responses of members of work organizations.

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Dyadic Goal Setting and Role Stress: A Field Study¹

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A field study was conducted over a 14 month period to examine goal setting as a dyadic, role making process between 46 managerial and staff employees (subordinates) and 15 officers and directors (supervisors) in an insurance company. Significant improvements in the goal behaviors and significant declines in stress were found following training.

The previous literature on goal setting has demonstrated the motivational effects of goal setting activities upon performance (Locke, 1967, 1968; Latham & Kinne, 1974; Ivancevich, 1977). This motivational approach to goal setting can be traced back to Taylor's research regarding performance standards (Taylor, 1939; Locke, 1975). (The 1939 edition of Taylor's *Scientific Management* contains his paper entitled *Shop Management*, his book entitled *The Principles of Scientific Management*, and a reprint of the public document Hearings Before Special Committee of the House of Representatives to Investigate the Taylor and Other Systems of Shop Management Under Authority of House Resolution 90; Vol. III, pp. 1377-1508.) The usefulness of this approach was subsequently supported by the laboratory research program of Locke and his associates (Locke, 1968; Locke, Cartledge, & Koepell, 1968). These tests were followed by a number of experimental and quasi-experimental studies in field settings conducted by Latham and his associates as well as other researchers (Latham & Kinne, 1974; Latham & Baldes, 1975; Latham & Yukl, 1975a, 1976; Wexley & Nemeroff, 1975; Steers, 1975, 1976; Ivancevich, 1976, 1977; Ivancevich & McMahon, 1977).

Taking a different approach, Latham and Yukl (1975b) and Miles (1974) suggest that goal setting activities also may serve to clarify the individual's organizational role. This implies that goal setting may be used

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as a role making technique and a mechanism for reducing role related organizational stress. This article reports on an empirical study aimed at examining the validity of this role making approach to goal setting activities. (For a complete presentation of this theoretical position, see James C. Quick, "Dyadic goal setting within organizations: Role-making and motivational considerations," *Academy of Management Review*, 1979, 4, in press.)

Many previous studies have examined one or two specific dimensions of the goal setting situation. For example, Ivancevich (1976, 1977) and Latham and Yukl (1975a, 1976) examined the comparative advantages of participative versus assigned goal setting. As a result, they excluded consideration of a number of dimensions of the goal setting situation that are identified as important by Steers and Porter (1974) and Latham and Yukl (1975b). An examination of these articles and the empirical research on goal setting suggests that there are three primary dimensions of the goal setting situation. These become particularly important when goal setting is viewed as a role making technique. The primary dimensions are (a) the properties of the task goals established; (b) the goal related behaviors of the employee; and (c) the goal related behaviors of the employee's supervisor.

In Locke's early goal setting research, the emphasis was on the properties of the task goals the experimenter assigned the subjects (Locke, 1966, 1967, 1968; Locke & Bryan, 1966, 1967). In particular, the researchers were concerned about the effects of the goal's difficulty level and its degree of specificity upon the individual's performance. As a result, goal difficulty and goal clarity were the important variables considered in the early field research on goal setting (Ronan, Latham, & Kinne, 1973; Latham & Kinne, 1974).

In addition, field researchers, in studying goal setting programs in organizations, began emphasizing the importance of participant behaviors (Carroll & Tosi, 1973; Latham & Yukl, 1975a; Ivancevich & McMahon, 1977). The initial focus was on the behaviors of the subordinates for whom the task goals were established. In particular, the literature reviews of Steers and Porter (1974) and Latham and Yukl (1975b) considered subordinate participation in the goal setting process to be an important participant behavior. However, several studies examining the effects of subordinate participation in the goal setting process have achieved inconclusive results (Latham & Yukl, 1975a, 1976; Ivancevich, 1976, 1977).

Recent field research literature has addressed the importance of supervisory behaviors in the goal setting situation. Particular emphasis has been upon the performance feedback provided by the supervisor (Steers, 1975, 1976; Kim & Hamner, 1976). These studies have examined either (a) the effects of varying amounts of feedback on performance or (b) the effects of various types of performance feedback upon attitudes and performance. Little attention has been focused upon the *quality* of the

supervisor's performance feedback—that is, how useful is the supervisor's feedback to the subordinate in terms of modifying his performance behaviors?

Based on this examination of the previous literature on goal setting, it is possible to set forth a dyadic framework that incorporates important goal behaviors of both the supervisor and the subordinate. This framework for identifying goal setting dimensions is depicted in Table 1. This framework emphasizes the task goals themselves, the goal behaviors of the supervisor, and the goal behaviors of the subordinate. Because this approach emphasizes the goal behaviors of both the supervisor and the subordinate, it focuses on the manager-employee dyad as the important unit of study in organization based goal setting programs. Such an approach to goal setting has not always been employed in goal setting programs; for example, it was not used with logging truck crews (Latham & Baldes, 1975).

TABLE 1
The Dimensions of the Goal Setting Situation:
A Dyadic Approach

<i>Task goal properties</i>
1. Difficulty level of the task goals
2. Clarity level of the task goals
<i>Supervisory goal behaviors</i>
1. Quality of performance feedback
2. Amount of performance feedback
<i>Subordinate goal behavior</i>
1. Participation in determining task goals

Mendelson (1967) has indicated that varying degrees of goal setting can be identified within many manager-employee dyads. In other words, he contends that often there is some degree of goal setting occurring in managerial dyads even though a formal goal setting program is not in existence. For example, managerial employees may have goals toward which they are working even in the absence of a formalized program; their supervisors will provide varying degrees of performance feedback even though a formalized feedback mechanism is not established. Therefore, it is possible to assess and examine the degree of goal setting activity occurring within a manager-employee dyad prior to the implementation or use of a formal goal setting program. The dyadic approach set out in Table 1 may be used as a framework for studying such goal setting activities.

If goal setting is to be used as a role making technique for reducing stress, it is necessary to consider the stress literature. The research of Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964); Rizzo, House, and Lirtzman (1970); and House and Rizzo (1972), which has a strongly psychological orientation, relied on questionnaire items for the measurement of role conflict and ambiguity. In addition to the psychological aspects of stress, a variety of physiological dimensions have been identified by other researchers (Benson, 1974; Friedman & Roseman, 1974;



McQuade & Aikman, 1974; Brown, 1977; Zaleznik, Kets de Vries, & Howard, 1977). Both the psychological and physiological dimensions of role stress are important because of the debilitating ailments and stress reactions experienced by employees. Zaleznik et al. (1977) identify several causes of various stress reactions among a large sample of Canadian managers. However, they do not identify techniques for reducing stress for these organization members.

The present study builds on previous goal setting research by using identified dimensions of the goal setting situation and incorporating these goal dimensions into a dyadic approach to the study of goal setting activities. This research extends the available knowledge of goal setting by (a) presenting a study of goal setting among managerial and staff personnel in the insurance industry and (b) providing a study of goal setting as a role making technique for reducing role stress.

METHOD

The study was carried out in the largest division of a nationally based insurance company. The division was located in the southwestern part of the United States and employed approximately 300 people. Of these, 20 to 25 percent were salaried, exempt employees. The remaining employees were clerical and/or nonsupervisory personnel, none of whom were much involved in the dyadic goal setting program.

The subordinates selected for the research were 46 junior officers, managers, and staff personnel within the division. These managerial and staff employees were involved in a variety of home office activities, such as supervising computerized system design personnel, determining underwriting risks for case applications, and interviewing employee applicants. They reported directly to 15 executive officers of the company, who were their supervisors in the goal setting program and on the job.

Measures

Dimensions of Goal Setting—Questionnaire items were used to measure the three primary dimensions of goal setting as set out in Table 1. Six scales were used in measuring these dimensions. Each scale was designed to measure one specific dimension—for example, the amount of performance feedback. The scales were based on those previously utilized by Steers (1976) and Ivancevich and McMahon (1977). In this study, however, each scale was composed of three items, one of which was a reverse scored item. This approach was used to overcome possible response bias within the sample. The scales were completed by the subordinates in the study (i.e., junior officers, managers, and staff personnel).

The intercorrelations among the goal setting scales and their reliabilities are reported in Table 2. It may be noted that the two feedback scales are significantly correlated and that each feedback scale is significantly

TABLE 2
Intercorrelations Among the Goal Setting Scales

	1.	2.	3.	4.	5.
1. Goal difficulty	(.70)*				
2. Goal clarity	.02	(.79)			
3. Feedback quality	.02	.69**	(.76)		
4. Feedback amount	.08	.43*	.57**	(.83)	
5. Participation	-.12	.32	.31	.25	(.64)

*Numbers in parentheses are reliability coefficients calculated using Cronbach's alpha.

* $p \leq .01$

** $p \leq .001$

correlated with goal clarity. These results are consistent with previous research reported by Carroll and Tosi (1973) and Ivancevich and McMahon (1977), which indicates that some significant intercorrelations among goal setting scales may be anticipated.

Indicators of Role Stress—The questionnaire scales previously reported by Rizzo et al. (1970) and House and Rizzo (1972) to measure role conflict and ambiguity were completed by the sample subordinates identified above. The reliabilities of these scales were calculated using Cronbach's alpha and found to be .94 for the ambiguity scale and .82 for the conflict scale.

Absenteeism was used as an additional indicator of role stress. A number of factors may contribute to absences from work, but absences due to illness were the appropriate measure used in this study. Zaleznik et al. (1977) found absence from work to be one symptom of cardiovascular difficulties. Therefore, as an indicator of stress, absence due to illness may be a rather useful index. In addition, if such absences are related to other perceptual indicators of role stress, the index may be considered an unobtrusive measure. Therefore, absenteeism due to illness or health problems may be an indicator of organizational stress.

To determine the validity of this approach, the relationship between absences due to illness and the perceptual role stress measures was examined. A significant positive correlation of $+ .30$ ($p \leq .05$) was found to exist between absenteeism and the combined role stress scales, and the stability of the absenteeism measure was acceptable ($+ .52$, $p \leq .001$), thus supporting the rationale for utilizing absenteeism for health reasons or illness as one indicator of role stress.

Dyadic/Goal Setting Training

Three data collection points were employed in this study. They are identified as T_b (before formal training in goal setting), T_1 (the first data point after training), and T_2 (a final assessment point). The formal training in goal setting was conducted between T_b and T_1 . The first measurement (T_b) occurred at the time the company initially considered using a formal

dyadic goal setting program, which was six months prior to formal training. The second measurement (T_1) was taken approximately five months after the formal training. The final measurement (T_2) was taken three months following T_1 and eight months following the formal goal setting training. The entire study spanned a 14-month period.

The training that occurred six months after T_0 consisted of a one day (eight hour) session composed of three units. Three identical training sessions were scheduled to accommodate all of the officers, managers, and staff personnel identified in the sample section above. The first training unit was presented in a lecture format and included an introduction to goal setting as a dyadic process; the history and use of goal setting in large organizations; and the purpose for using it in the company.

In the second training unit, program participants identified major areas of responsibility for their jobs and developed written task goals for each responsibility area. This unit was presented in a discussion/active participation format after a brief lecture by the trainer. It was found that the participants needed considerable practice in preparing preliminary task goals of appropriate difficulty and clarity (Table 1) for review with their supervisors.

In the final unit of the training, participants were involved in a series of three in-depth role playing exercises. Each participant alternately assumed the role of supervisor, subordinate, and observer in a goal setting session during which the subordinate's task goals were reviewed and discussed. Throughout the role plays the trainer encouraged active participation by the trainee enacting the subordinate role (see Table 1). The trainer also emphasized the importance of developing goals that were both challenging and specific.

The emphasis throughout the training session was on the dyadic nature of the goal setting process. In accordance with the approach set out in Table 1, the trainer focused on the importance of the supervisor-subordinate relationship; the value of clear, specific task goals; the importance of frequent, useful performance feedback, and the necessity for active subordinate participation in the goal setting sessions. The dyadic nature of the goal setting process was reinforced throughout the role playing exercises that composed the third training unit.

RESULTS

Impact of Formal Training

To determine the impact of the formal goal setting training program, the dimensions of goal setting were examined over the period of the study. Mean scores on each of the dimensions were determined, difference scores ($T_1 - T_0$ and $T_2 - T_0$) were calculated and tested for significance using the *t*-test. The data are presented in Table 3 and indicate that significant changes occurred between T_0 and T_1 for each of the dimensions of goal

TABLE 3
Changes in the Dimensions of Goal Setting During the Study

Dimension	Mean Scores ^a			Difference $T_1 - T_0$	Difference $T_2 - T_0$
	T_0	T_1	T_2		
<i>Task goal properties</i>					
Difficulty	3.35	3.73	3.50	+ .38*	+ .15
Clarity	3.39	3.74	3.52	+ .35*	+ .13
<i>Supervisory goal behaviors</i>					
Feedback quality	2.72	3.33	3.21	+ .61***	+ .49**
Feedback amount	2.79	3.30	3.35	+ .51**	+ .56**
<i>Subordinate goal behavior</i>					
Participation	3.37	4.01	3.86	+ .64***	+ .49**

^aMean scores are based on scale ratings of 1 (low) to 5 (high).

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

setting. For example, within five months after the formal training, significant improvements were found in the clarity and difficulty of the task goal formally established. This was anticipated, as were the improvements in supervisory and subordinate goal behaviors.

The $T_2 - T_0$ difference scores indicate that these improvements were still noted in the eighth month after training, although the task goal property difference scores are not significant. The improvements in participatory goal behaviors continue to be significant at T_2 . However, the gain diminutions are consistent with findings reported by Ivancevich (1976, 1977).

Goal Setting and Role Stress

To examine the effects of goal setting activities on role stress, changes in role stress measures were examined over the fourteen month period. Mean scores, two difference scores ($T_1 - T_0$ and $T_2 - T_0$), and the significance levels of the changes were calculated for role conflict, role ambiguity, and absenteeism. The data regarding these stress indices are presented in Table 4.

TABLE 4
Changes in Measure of Stress During the Study

Stress Measure	Mean Scores ^a			Difference $T_1 - T_0$	Difference $T_2 - T_0$
	T_0	T_1	T_2		
Role conflict	2.98	2.10	2.30	-.88***	-.68***
Role ambiguity	2.61	2.05	2.17	-.56**	-.44*
Absenteeism	4.76 ^b	2.90	5.16	-1.85*	+ .40

^aMean scores are based on scale ratings of 1 (low) to 5 (high).

^bThis is in hours per month.

* $p \leq .1$

** $p \leq .01$

*** $p \leq .001$

The data indicate significant declines in the amount of stress during the fifth month following the dyadic goal setting training. The declines in role conflict and ambiguity were highly significant. The decline in absenteeism was less significant. It was suggested earlier that absenteeism may be attributable to stress from several sources and the dyadic goal setting program was designated to affect only the stress attributable to the employee's organizational role. It was not anticipated that goal setting would affect other sources of stress for the employee, such as stress attributable to his (or her) nonorganization-based roles.

The data identify the significant reductions in role conflict and role ambiguity being maintained by the eighth month after goal setting training ($T_2 - T_b$). However, by T_2 there was no significant difference in the absenteeism rates for the measurement point and T_b .

DISCUSSION

Goal setting activities typically have been studied using samples of (a) students (Locke, 1966, 1967, 1968; Frost & Mahoney, 1976; Organ, 1977) or (b) nonsupervisory employees in varied organizational settings (Ronan et al., 1973; Latham & Kinne, 1974; Latham & Yukl, 1975a, 1976; Kim & Hamner, 1976; Ivancevich, 1976, 1977; Ivancevich & McMahon, 1977). Only a few studies have examined goal setting among managerial, supervisory, and/or staff employees, and these were conducted in manufacturing firms (Carroll & Tosi, 1973), medical centers (Wexley & Nemeroff, 1975), and public utilities (Steers, 1976). The present study adds to the literature examining goal setting activities among managerial and staff employees. Specifically, the results indicate that dyadic goal setting has a positive effect on the goals and goal behaviors of managers and staff employees in an insurance company.

However, positive gain diminutions, noted in Tables 3 and 4, occurred approximately eight months after training. These are consistent with previous results reported by Ivancevich (1976, 1977). They suggest that organizations may need to utilize (a) periodic retaining programs and/or (b) formal schedules of reinforcement if they are to maintain the gains and benefits of goal setting over extended periods of time.

By scheduling managers and their employees for retraining on an annual basis, the organization could reemphasize the importance of goal setting activities and participants would have the opportunity to build upon previous learning. It would not be expected that gains similar to those found in the first year would result in the second year. Rather, the incremental learning would aid in solidifying the previous gains.

An alternative approach is to use various types of reinforcers. These might consist of internal memos or bulletins that focus on particular aspects of the goal setting process. For example, one bulletin might address the issue of supervisory performance feedback and its role in assisting employees to redirect their performance behavior and/or modify

their task goals. Another bulletin may examine the issue of preparing appropriate task goals and present examples of good and poor goals.

More powerful reinforcement programs could tie goal behaviors to cash incentive bonuses for managers. One company that has employed such an approach has found cash bonuses to be effective in stimulating goal oriented behaviors and goal attainment. These bonuses are awarded by the Compensation Committee of the company's Board of Directors "...based upon performance against preestablished goals," (notice of 1977 Annual Meeting; name of company withheld). The total amounts of these bonuses were approximately \$900,000 in 1975; approximately \$600,000 in 1976; and approximately \$775,000 in 1977. Such cash bonuses act as incentives, in accord with the philosophy of Taylor (1939). However, the employee's annual salary is not directly tied into goal setting performance. The annual salary is treated more as a guaranteed minimum income for the employee.

This article has proposed to extend the literature on goal setting by presenting an exploratory study of dyadic goal setting as an aid to role making in organizations and a technique for reducing employees' role stress. The preliminary results presented here provide initial support for Miles' (1974) proposition in this regard. The data suggest that dyadic goal setting activities may have a role making function when used in organizational settings, thus reducing role stress for employees. The significant difference scores in Table 4 ($T_1 - T_0$ and $T_2 - T_0$) suggest that goal setting activities may (a) clarify an employee's organizational role and (b) facilitate the communication of consistent and compatible role expectations to the employee. In addition, there is some indication that goal setting may reduce the physiological consequences of stress for employees.

Before stronger confirmation of these physiological effects is possible, additional methodological investigation is necessary. The psychological aspects of stress have been widely investigated over the past decade, but comparatively less attention has been focused on the physiological dimensions of stress in organizational settings. Consequently, the works of McQuade and Aikman (1974), Brown (1977), and Zaleznik et al. (1977) are of particular importance. Organizational researchers need to explore the relationship between the psychological and physiological dimensions of stress before additional advances are possible in understanding stress in organizations or examining techniques for reducing stress for employees.

This study has suggested the existence of a significant positive relationship between absenteeism (a physiological indicator of stress) and role stress (specifically, role conflict and ambiguity as two psychological indicators of stress). However, there is a need for research investigations that more directly integrate the medical-physiological study of stress with the role-psychological study of stress. Such investigations might explore the relationship between psychological stress and various physiological indices of stress, such as elevated systolic and diastolic blood pressures; elevated levels of blood fats (for example, cholesterol and triglyceride);

elevated epinephrine, or adrenaline, levels; the occurrence of ulcers; or muscular tension problems. This line of investigation might then indicate to organizational researchers the most appropriate physiological indices of stress to use in organizational settings.

The consideration of these physiological variables suggests one of the limitations of the present study, which is the absence of nonperceptually based measures of stress other than absenteeism. Future investigations should be designed in conjunction with qualified medical doctors or physiological psychologists. Exploratory studies conducted in cooperation with these medical researchers may indicate the most appropriate of the physiological measures for examining techniques for reducing stress and improving role making in organizations. In addition, such exploratory studies might suggest the appropriate time intervals required for significant physiological changes to occur.

A second limitation in the present study is the absence of a control group within the quasi-experimental design employed. This was not possible in the organization used in the study due to the division-wide implementation of the goal setting program for all salaried, exempt employees. This absence of a control group allows for the possibility that factors other than the dyadic goal setting program resulted in the reductions in stress noted in Table 4. During the last seven months of the study there was some reorganization occurring through the corporate headquarters which would affect some of the sample members' jobs. However, these reorganization activities had not been implemented by the end of the present study (T_2). Such changes might be expected to increase role conflict, ambiguity, and possible absenteeism rather than reduce them.

In summary, this study does provide some support for the utility of dyadic goal setting as a role making technique within supervisor-subordinate dyads. It has extended the current research literature by providing a study of goal setting using a sample of insurance company executive officers, managers, and staff personnel. Finally, in identifying future research needs, it is suggested that cooperative studies between medical and organizational researchers be undertaken so that a more complete examination of the physiological dimensions of stress in organizational settings may be achieved.

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An Analysis of Participation in Decision Making Among Project Engineers

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In this study the nine most relevant job decisions for project engineers were named by the engineers themselves. Five hypotheses focused on the degree of participation in decision making by the project engineers. The results indicate that, in a number of personality, affective, stress, and performance variables, the decisional "deprived" and "saturated" groups are different from the group in decisional "equilibrium."

Many behavioral scientists have argued for more opportunities for subordinates to participate in the decision making process (Argyris, 1964; Likert, 1961; Lowin, 1968; McGregor, 1960; Mulder, 1971). Pointing to evidence of lack of commitment, lower morale, and restriction of productivity under traditional autocratic decision making, they have argued for increased subordinate participation in job related decisions. Behavioral scientists also recognize that although participation in decision making (PDM) has significant potential for improving attitudes and performance of participants in some situations, there have been few research investigations of quantitative performance variables (Mulder, 1971).

Although there is an abundance of research that is called PDM, few investigators have studied this concept using the participant as the focal point. A recently completed review of the literature indicates over 70 studies that fit into a broadly defined category called PDM (Locke & Schweiger, 1979). Yet, only a handful of these studies fit into what is referred to in this paper as PDM from the participant's perspective. A key point in this interpretation of PDM is that decisions selected by participants as being important are the main focus for analysis.

This study attempts to extend, replicate portions of, and enlarge upon the work of previous researchers investigating participation in decision making as reported by participants (Alutto & Belasco, 1972; Ruh, White, & Wood, 1975; Strauss, 1963; Tosi, 1970; Vroom, 1960). None of the

previous research on PDM in organizational settings has focused on highly skilled and trained individuals such as engineers who have indicated which decisions are preferred. The impact of PDM for engineers can only be speculated about because of the lack of available research.

SELECTED RESEARCH FINDINGS

A review of the PDM literature reveals four streams of research. First, participation in decision making is considered a viable management strategy for the introduction and acceptance of technological changes (Coch & French, 1948; Marrow, Bowers, & Seashore, 1967). Second, research indicates that decision making deprivation leads to job dissatisfaction and high levels of job tension (Alutto & Acito, 1974; Alutto & Belasco, 1972; Alutto & Vredenburg, 1977). Such deprivation means that the decision maker is participating in fewer decisions than he or she would like to participate in. Third, Patchen (1970) in a study of the Tennessee Valley Authority (TVA) of primarily technicians and laboratory testers found that PDM leads to increased individual integration into the organization. The individual becomes more involved in the work project when he or she is involved in participative decision making. Siegel and Ruh (1973) in a study of manufacturing employees also found PDM to be positively related to job involvement. Finally, not all research on PDM points to the unequivocal superiority of increased decision making involvement. Experiments by French, Israel, and As (1960) and Fleishman (1965) found no significant difference in production output between employees participating and employees not participating in job decisions. In addition, in a classic field experiment, Morse and Reimer (1956) found increased production following each of two experimental programs, one of which increased PDM by employees and the other increased hierarchical control by superiors in the decision making process.

The four streams of research suggest that the impact of PDM may vary from one situation to another and from one group to another. Given the increased interest in society concerning the quality of work life, personal independence, and self-realization, PDM would appear to be a candidate for increased theoretical and empirical attention. Of particular interest is how individuals participating in decision making at various levels of involvement respond to their jobs, life, and the organization.

Despite the assumption of many behavioral scientists that PDM is a desirable and effective organizational strategy (Lowin, 1968; Tannenbaum, 1968), some individuals have little desire to participate. They would be doing so at a level that exceeds what they desire or consider equitable.

Another pertinent issue concerns the depth of PDM. Participation depth can be shallow, as in the case of the individual involved in a decision about what day of the week to circulate a company newsletter. On the other hand, participation can be deep, such as in decisions regarding promotion, salary, and career counseling. One important research issue thus

involves the examination of relevant decision situations. A study of PDM situations concerned with trivia or lacking depth and content offers little insight into the consequences of being involved in the decision process.

A theoretical framework is needed to study participating in important decision situations. Alutto and Belasco (1972) offer a worthwhile paradigm for examining the theoretical aspects of PDM. They suggest a continuum of employee PDM that describes three conditions:

- (1) decisional deprivation, or participation in fewer decisions than desired;
- (2) decisional equilibrium, or participation in exactly the number of decisions that are desired; and
- (3) decisional saturation, or participation in more decisions than desired.

In most organizations, a discrepancy exists between the actual and preferred rate of decision making. It has been proposed that under the deprivation and the saturation conditions, more negative job attitudes and higher levels of job tension exist (Alutto & Acito, 1974).

THE PRESENT RESEARCH

Although a few studies have used the same PDM framework (Alutto & Acito, 1974; Alutto & Belasco, 1972; Alutto & Vredenburg, 1977), none of these has been concerned with highly skilled project engineers, as is the present study. In addition, in order to probe the degree of participation, the studies typically have used researcher developed decision situation formats. Whether similar or different findings would emerge when job knowledgeable engineers create the decision situations used to examine PDM has not been subjected to empirical investigation.

A determination of exactly how such participation conditions as deprivation, equilibrium, and saturation are related to personality and demographic, affective, stress, and performance variables has both theoretical and research value. Any managerial use of a PDM framework needs to be examined in various organizational settings using different occupational groupings. Currently, no studies relate the three decision participation conditions either to subjective performance ratings or to objective performance indices. The present study looks at both subjective and objective performance evaluations as they are linked to the three decision participation conditions.

Improved managerial understanding of the job performance and decision participation condition linkage seems to be an important step in improving overall organizational effectiveness. Any significant differences found among participants who are decisionally deprived, who are in equilibrium, and who are saturated could suggest to managers types of programs to correct decision making problem areas.

In order to examine PDM and various personality and demographic, affective, stress, and job performance variables, a number of hypotheses

were developed for the present study. They were based on a previously developed model and various studies used to test the model (Alutto & Belasco, 1972).

1. *Decisional deprived participants will indicate significantly lower self-esteem, be younger, and have less seniority than either the decisional equilibrium or decisional saturated participants.*

2. *Decisional deprived participants will indicate significantly lower affective scores on such factors as attitudes toward the company, organizational commitment, job satisfaction, and purpose in life than the decisional equilibrium participants.*

3. *Decision deprived participants will report significantly higher job-related stress on such factors as role conflict, role ambiguity, fatigue, physical stress, and job tension than the decisional equilibrium participants.*

4. *Decisional deprived participants will be rated significantly lower on overall performance and have a higher performance cost index than decisional equilibrium participants.*

5. *As decisional deprivation increases within the decisional deprivation group, each of the variables investigated in Hypotheses 1-4 will become more negative. For example, the high decisional deprivation participant will be a significantly poorer performer than will be the low decisional deprivation participant.*

METHOD

Participants

In this study 154 project engineers employed by a large engineering development and construction firm were used as decision making participants. Each of the organization's 201 project engineers was asked to participate voluntarily in the study. Twenty-seven project engineers did not participate because of time constraints, overseas assignments, or personal reasons. No significant differences on such variables as age, job tenure, or project tenure existed between those volunteering and those not volunteering for the study.

The project engineers were responsible for supervising a team of 15 to 20 junior engineers, technicians, and design engineers on construction projects. They were involved with project execution, cost control coordination of subcontracting, and scheduling. Projects typically lasted between 18 months and 4 years. Each engineer had at least 10 months' experience on a project at the time of the study.

The company policy is to have project engineers involved in as many phases of decision making as judged possible by the project managers. The company stresses involvement of all engineers, young and old as well as long and short tenured. The policy has been in effect for the last 10

years because of the organization's phenomenal growth rate. The number of employees tripled in 10 years.

Decision Situation Set

In previous research on PDM, researchers created their own set of decision situations (Alutto & Acito, 1974). To develop a more relevant and meaningful set of decision situations, a randomly selected sample of 20 project engineers was interviewed in the present study. The structured interview focused on the most important decisions made by project engineers in the company. These 20 project engineers expressed their preferences for involvement in job related decisions. Initially, each of the 20 interviewees specified what decisions were meaningful to project engineers. After the individual interviews, a nominal group discussion procedure was used to reach a consensus (Delbecq, Van de Ven, & Gustafson, 1975).

The individual interviews and nominal group discussion resulted in an identification by the project engineers of the nine most relevant and preferred decision situations. They were:

- (1) selection of junior engineer, technician, and design personnel for the team;
- (2) suggestion of major inputs into the salary and promotion reward package for the team;
- (3) authority to make modifications in project policies and procedures;
- (4) final approval with senior project management coordinator on engineering, design, and construction methods;
- (5) primary evaluation input on assessment of team members;
- (6) review of all project progress reports and authority to make accuracy corrections if necessary;
- (7) preparation of final cost reports for headquarters;
- (8) authority to finalize customer-organization scheduling progress reports; and
- (9) final arbitrator of team member technical grievances.

Survey Questionnaire

A survey questionnaire was used to collect data from the 154 project engineers. The 20 engineers involved in the interview phase that generated the nine decision situations did not complete the questionnaire. Each questionnaire respondent completed the instrument in the headquarters conference room at some point during a three week period.

Measures

Decision Making—The project engineers indicated whether they currently participated in each of the nine relevant areas and whether they

desired to do so. Their responses were used to identify decisional deprivation, equilibrium, and saturation. First, the number of decisions in which a project engineer perceived himself participating was determined (range from 0 to 9). The engineers were asked to evaluate on a checklist the decisions they actually participated in on a regular basis when performing a job. Then the number of decisions in which the engineer wanted to participate in was determined (range from 0 to 9) by the use of a checklist. The difference between the desired and actual participation scores yielded a discrepancy index that ranged from -9 to +9. A negative score indicated a decisional saturation condition. A zero score specified a decisional equilibrium condition. A positive score indicated that a decisional deprivation state was present.

A large positive score, +7, +8, or +9 indicated a high degree of deprivation. On the other hand, a small positive score of +1 or +2 suggested minimal or slight amounts of decisional deprivation.

Of the 154 engineers, 30 were randomly selected to complete the decision situation portion of the questionnaire a second time approximately one month later. This test-retest procedure yielded a stability coefficient of .92 for the decisional participation measure.

In this study differences between desired and actual decision making were used only to categorize engineers. However, because the use of difference scores is so controversial, caution was used. In order to overcome the problem of possible severe unreliability in using difference scores, an estimate of the difference score reliability was calculated (Cohen & Cohen, 1975). Difference score reliability was calculated by:

$$r_{(D-A)(D-A)} = \frac{[(r_{DD} + r_{AA})/2] - r_{DA}}{1 - r_{DA}}$$

The reliability of the desired responses of the randomly selected sample was .86 and the reliability of the actual responses was .90. The correlation of the desired and actual responses was .58. Therefore, the reliability of difference scores (used only to categorize engineers) was calculated as .71. Because reliabilities of even .60 are not uncommon in the behavioral sciences and in some opinion surveys, a reliability of .71 would be considered reasonably good (Cohen & Cohen, 1975). This is not a claim that difference scores are always acceptable. In this study, in which no predictions or prescriptions are offered, the .71 reliability appears to be at least acceptable.

Difference scores were used to categorize individuals in a manner employed in previous research involving teachers (Alutto & Belasco, 1972), manufacturing employees (Alutto & Acito, 1974), and nurses (Alutto & Vredenburg, 1977) so that comparisons of other research with the present study results would be possible. It should be remembered that difference scores are not being used here to study change. They are used

only to categorize the engineers as decisionally deprived, in a state of equilibrium, or saturated.

The notion that a more parsimonious conclusion might be drawn by considering only the actual number of decisions made was considered. It might be reasonable to assume a curvilinear relationship between group differences on the number of actual decisions participated in. Therefore, after each engineer was categorized into one of the three groups the mean number of decisions participated in was calculated. It was found that actual decisions participated in were $M = 4.0$ deprivation, $M = 4.1$ equilibrium, and $M = 4.9$ saturated. These data indicate that the deprivation and equilibrium engineers reported making significantly fewer decisions than did the engineers in the saturation group. The between-group mean differences of actual decisions made appear to reject the curvilinear relationship assumption. A test-retest check of the actual decisions made yielded a stability coefficient of .83.

Personality—Vroom (1960) examined participation in decision making in relation to personality characteristics. Based on his findings, it was expected that the degree of authoritarianism an individual reported would be related to the three decisional participation conditions. The exact nature of the relationship was not hypothesized because of the contradictory results offered by Vroom (1960), Tosi (1970), and Abdel-Halim and Rowland (1976).

A shortened version, 14 items, of the California F-scale (Adorno, Frenkel-Brunswik, Levinson, & Sanford, 1950) was used to measure authoritarianism. Participants checked one of five alternatives for each item. The internal consistency measured by coefficient alpha (Cronbach, 1951) was .77.

A decisionally deprived individual could suffer self-esteem problems. Self-esteem is used here as an indicator of an individual's self-worth in relation to his standards. The self-esteem variable was measured by a 10-item scale (Rosenberg, 1965), using a 7-point Likert interval. The coefficient alpha was .83.

Affective Responses—A number of measures were used to assess participants' feelings about the company and various facets of the job. Once again, the hypothesized differences in the decisional situations were assumed to be important. A deprived decision maker should exhibit less favorable attitudes, little organizational commitment, lower internal motivation, and less job satisfaction.

Attitudes toward the company were measured by a 10-item scale (King, 1960). The 10 items provided a score for each participant that indicated attitudes toward company policies, rules, regulations, and practices. The participants responded on a 7-point Likert-type scale. The coefficient alpha was .74.

Patchen (1970) postulated that personal integration is related to a person's decisional participation. Organizational commitment is an indicator of such integration. Therefore, an index of organizational commitment

was found for each participant using the Porter, Steers, Mowday, and Boulian (1974) scale. Included in the Porter et al. 15-item organizational commitment scale are items that tap a person's perceptions about loyalty, willingness to exert effort to achieve organizational goals, and acceptance of organizational values. The participants responded to 7-point Likert-type scales, ranging from "strongly disagree" to "strongly agree." A measure of organizational commitment was found by taking the mean score across all items. The coefficient alpha was .84.

Internal motivation designates the degree to which a person is self-motivated to perform effectively on the job. This affective variable was measured by six items taken from the Job Diagnostic Survey (JDS), a questionnaire developed by Hackman and Lawler (1971). A 7-point scale ranging from "disagree strongly" to "agree strongly" was used. The coefficient alpha was .87.

The Job Descriptive Index (JDI) developed by Smith, Kendall, and Hulin (1969) was used to measure various affective facets of job satisfaction. The JDI measures satisfaction of five factors: the work itself, pay, promotion opportunities, co-workers, and supervision. The JDI has been shown to have acceptable validity and reliability (Smith, Smith, & Rollo, 1974). For the present project engineering sample, Spearman-Brown reliabilities for the five facets ranged from .78 (pay) to .86 (co-workers).

Stress—Recent literature has revealed as many as 23 job-related stresses (Caplan, Cobb, French, Van Harrison, & Pinneau, 1975). The present study focused on five of these stresses: role conflict, role ambiguity, fatigue, physical stress, and job tension. Role conflict and role ambiguity were measured by responses to items taken from the Rizzo, House, and Lirtzman (1970) scales. Role conflict (eight items) was defined as the perception of conflicting role requirements. Role ambiguity (six items) was defined as the lack of role clarity an individual perceives in his work responsibilities. A 7-point scoring scale with responses ranging from (1) very false to (7) very true was checked for each of the items. A varimax factor analysis of these items confirmed the structure and items making up these two scales. The coefficient alpha reliabilities for the two scales were .79 for role conflict and .83 for role ambiguity.

Fatigue, or the feeling of a lack of energy, was measured by averaging three items that were rated on a 7-point agree-disagree scale (Quinn & Shepard, 1974). The items were: "I feel completely worn out at the end of each work day," "I find it difficult to get up and come to work in the morning," and "I become tired in a short time on my job." The Spearman-Brown reliability of the scale was .74.

The physical stress index was derived from summing the responses to four questions that had five possible answers ranging from "several times a week" to "almost never." A sample of the questions was:

Listed below are some physical problems that often bother people.

How often does each of them happen to you:

A. Upset Stomach

The Spearman-Brown reliability of the scale was .79.

Job tension is defined as feelings generated by contradictory or unclear job pressures. The scale of nine items was taken from Kahn, Wolfe, Quinn, Snoek, and Rosenthal (1964). A 7-point scale ranging from agree to disagree was used. The coefficient alpha was .85.

Performance—Independent ratings of participants' job performance were collected from immediate supervisors. In order to overcome scale distribution problems typically found in performance ratings (Campbell, Dunnette, Lawler, & Weick, 1970), superiors were asked to rate participants as compared to peers on five job performance factors: quality of work, meeting cost schedules, meeting project deadlines, engineering competence, and ability in developing team members. Each factor was rated on a five point scale ranging from "well below peers" to "well above peers." The PA 2 factor analysis program was used to analyze the data. The factor structure which best represented the data was that of a single-factor that explained 57.3 percent of the variance. Thus, supervisor ratings of the five performance items were summated into an overall performance rating.

Each project engineer in the study had a cost target that was monitored at least once a month. Cost figures for 4 months from the past 12 months were randomly selected and averaged to derive the cost index. The cost index was determined by dividing actual project costs for each phase by planned costs. An index greater than 1.00 indicated that planned costs were being exceeded. On the other hand, a cost index of less than 1.00 indicated performance that was better than planned. Both the participants and their immediate supervisors stated in discussions at headquarters that the cost index was the most important measure of performance.

FINDINGS

The distribution of subjects based on each of the three decisional conditions—deprived, equilibrium, saturated—is presented in Table 1. Each project engineer's condition of decisional participation was obtained by deriving the number of decisions desired to participate in and the number of decisions in which there was actual participation. The absolute difference between these two sums (desired minus actual) provided the basis for placing the project engineer in one of three groups. An engineer who received a negative score was placed in the saturated category. For example, one engineer desired to participate in four decisions, but actually participated in five decisions. His score of -1 made him eligible for the saturated group. In developing the table, it was noted that he desired four decisions and reported participating in five. Each individual's desired and actual statements in the saturated group were recorded to develop the saturated group's frequency figures presented in Table 1.

Over 47 percent of the participants reported being decisionally deprived, and approximately 30 percent reported being decisionally saturated. Only approximately 23 percent or 35 project engineers reported

being in a decisional equilibrium situation. In addition, although no project engineers reported making more than seven decisions, over 20 percent wanted to participate in more than seven decisions.

The decisional equilibrium participants were distributed through the range, although none reported participating in all nine relevant decisions. The decisional saturation participants reported a desire to be involved in fewer relevant decisions.

TABLE 1
Project Engineers Distribution
on Basis of Decisional Condition

Number of Decisions	State of Decision Making Participants				
	Deprived: n = 73		Equilibrium*: n = 35		Saturated: n = 46
	Actual	Desired	Actual	Desired	Actual
0	0	0	0	0	0
1	8	4	6	0	3
2	7	5	6	7	12
3	13	9	5	5	10
4	14	10	6	9	10
5	10	7	5	6	3
6	11	9	4	7	4
7	10	14	2	7	4
8	0	8	1	3	0
9	0	7	0	2	0
	73	73	35	46	46
Percentage of total	47.4		22.7		29.9

*Condition in which actual participation rate is equal to desired rate of decision making participation.

Initially, bivariate methods (zero-order and mean differences) were used to examine between-group data. However, the importance of partialling out the demographic variables from the effects of participating in important decisions was recognized. Table 2 presents data comparisons across the three decisional model groups on each of the variables studied. An analysis of covariance (ANCOVA) procedure, partialling out the effects of age and tenure, was used to calculate the adjusted means presented in parts A, B, C, and D of Table 2. In terms of the personality and demographic variables considered in Hypothesis 1, the participants were differentially distributed on every factor except authoritarianism. The self-esteem, age, job tenure, and project tenure variables provided a basis for differentiating groups. Decisionally deprived participants reported significantly lower self-esteem, were younger, had less job tenure, and less project tenure than did participants in both the decisional equilibrium and saturation situations.

Before the demographic variables were partialled out, the data analysis revealed that the deprived level of participation was inversely and significantly related to self-esteem, attitudes toward the company, organizational commitment, work and supervisor satisfaction, and

purpose in life. Applying ANCOVA eliminated two of the six statistically significant personality and affective between-group differences.

The use of ANCOVA for the stress and performance variables indicated that the pattern of the bivariate and multivariate analysis of the between-group differences is only marginally different. The findings for this study and sample underscore the need for partialling out the effects of demographics in analyzing the affective responses of the project engineers. When the effects of the three demographic variables are controlled by ANCOVA procedures, the attitudes toward the company and the purpose in life between-group differences are reduced below statistical significance. The ANCOVA analysis also indicates that the self-esteem portion of Hypothesis 1 cannot be supported.

The results regarding Hypothesis 2 also were not supported. Bivariate analysis (not shown) indicated that decisionally deprived participants

TABLE 2
Analysis of Covariance: Adjusted Means,
Deprivation, Equilibrium, Saturation^a

Variables	Group Mean Scores			Significance Level
	Deprived n = 73	Equilibrium n = 35	Saturation n = 46	
A. Personality and demographic ^b				
Authoritarianism	16.3	16.5	16.2	NS
Self-esteem	50.3	51.6	51.8	NS
Age	<u>34.8*</u>	36.1	39.9	.01
Job tenure	<u>6.4</u>	<u>8.1**</u>	11.3	.01
Project tenure	1.4	2.1	2.8	.01
B. Affective responses				
Attitudes toward the company	22.3	23.1	23.6	NS
Organizational commitment	<u>63.6**</u>	79.4	<u>70.2**</u>	.01
Internal motivation	24.1	23.1	22.0	NS
Work satisfaction	<u>35.1</u>	46.0	<u>30.2</u>	.01
Pay satisfaction	22.6	23.8	22.4	NS
Promotion satisfaction	31.4	31.6	32.8	NS
Co-worker satisfaction	42.6	42.1	42.0	NS
Supervisor satisfaction	<u>32.4</u>	41.3	<u>30.1</u>	.01
Purpose in life	41.8	40.4	42.3	NS
C. Stress & physiological reactions				
Role conflict	32.6	33.6	32.1	NS
Role ambiguity	26.4	26.1	25.2	NS
Fatigue	11.0	12.1	11.4	NS
Physical stress	14.8	<u>8.7*</u>	11.4	.01
Job tension	56.1	<u>40.2*</u>	50.3	.01
D. Performance				
Overall rating	<u>14.3</u>	20.1	<u>16.0</u>	.01
Cost index ^c	<u>1.4</u>	1.0	<u>1.7</u>	.01

^aDegree of freedom (2/153). Underline with no asterisk or underline with one asterisk designates that mean value is significantly different from the highest mean value in the row as determined by the Scheffe' multiple-range test. For example, for job tension, the 40.2 mean for decisional equilibrium participants is significantly lower than the other two group means of 56.1 and 50.3. Underline with two asterisks indicates that mean values are significantly different from each other as determined by the Scheffe' test.

^bFor the A section the authoritarianism and self-esteem means are adjusted via ANCOVA.

^cThe cost index means (1.4 and 1.7) are significantly different than the mean value of 1.0.

reported significantly lower attitudes toward the company, less organizational commitment, lower work and supervision satisfaction, and less purpose in life than did their decision equilibrium counterparts. No significant differences were found between groups in internal motivation, pay, promotion, and co-worker satisfaction. However, the ANCOVA analysis in Table 2 suggest that Hypothesis 2 cannot generally be supported. Only for the organizational commitment variable did the deprived participants indicate significantly lower scores.

The findings regarding the Hypothesis 3 stress and physiological variables were somewhat mixed. The decisional deprived participants reported significantly higher physical stress and job tension than did the decisional equilibrium participants. The Scheffé' multiple comparison test of the Table 2 data indicated that the decisional deprived participants were experiencing more role conflict and physical stress than were the decisional saturation participants. There were no significant differences found between groups regarding role conflict, role ambiguity, or fatigue. Therefore, portions of Hypothesis 3 were generally supported by the results.

For both performance measures shown in Table 2, the supervisor rating and the cost index, the decisional deprived participants received the lower assessment when compared with the decisional equilibrium participants.

TABLE 3
Degree of Decisional Deprivation^a

<i>Variables</i>	<i>Low (0-2)</i>	<i>Medium (3-5)</i>	<i>High (5)</i>	<i>Significance Level</i>
A. Personality and demographic				
Authoritarianism	17.1	16.9	17.9	NS
Self-esteem	56.2	54.1	43.9	.01
Age	33.4	34.1	36.9	NS
Job tenure	6.1	6.5	6.6	NS
Project tenure	1.5	1.4	1.3	NS
B. Affective responses				
Attitudes toward the company	27.4	28.1*	10.1*	.01
Organizational commitment	60.3	61.1	60.2	NS
Internal motivation	28.6	26.3	29.2	NS
Work satisfaction	38.0	34.2	32.2	.05
Pay satisfaction	23.1	23.3	23.6	NS
Promotion satisfaction	35.1	34.6	33.9	NS
Co-worker satisfaction	43.6	44.1	44.0	NS
Supervisor satisfaction	36.0	32.1*	23.0*	.01
Purpose in life	40.1	31.8	42.0	NS
C. Stress and physiological reactions				
Role conflict	35.3	35.6	46.0	.01
Role ambiguity	29.1	28.3	30.1	NS
Fatigue	12.3	11.4	12.1	NS
Physical stress	10.8	11.2	16.4	.01
Job tension	53.6	52.4	58.7	.01
D. Performance				
Overall rating	16.2	15.8	14.0	.01
Cost index	1.5	1.5	2.6	.01

^aDegree of freedom (2/72). Underline designates that mean value is significantly different from highest mean value in the row as determined by Scheffé' test. * and underline with single asterisk indicate that mean values are significantly different from each other as determined by the Scheffé' test.

Thus, Hypothesis 4 is supported by the findings. There were no significant differences between the deprived or saturated participants on either of these two performance measures.

Comparisons within groups were made for each of the three decisional conditions. Within both the decisional equilibrium and saturated groups, there were few differences between those participants classified as low, moderate, and high in actual decision making involvement. This finding is in line with that of Alutto and Belasco's (1972) study of teachers.

The impact of actual decision making involvement was clearly observed when examining the within-group differences of decisional deprived participants. This analysis was suggested by Hypothesis 5. For purposes of analysis, the 73 decisional deprived participants were placed in three deprivation categories: low deprivation (zero-two decisions), moderate deprivation (three-five decisions) and high deprivation (more than five decisions). ANCOVA procedures again were used to analyze the data.

Data in Table 3 indicate some serious consequences of increased decisional deprivation among project engineers. The participants reporting higher levels of decisional deprivation report significantly lower self-esteem, lower attitudes toward the company, lower work and supervision satisfaction, more role conflict and ambiguity, greater physical stress, more job tension, and poorer performance ratings and cost index. The data in Table 3 indicate that the stress and performance portions of Hypothesis 5 are generally supported.

DISCUSSION

The present study extends previous research findings of Alutto and Belasco (1972) and Alutto and Vredenburg (1977). Earlier research relied on researcher generated decision situations and a limited number of personality and affective response variables. In this study such previously unresearched variables as self-esteem, project tenure, role ambiguity, fatigue, physical stress, performance rating, and performance cost were considered. No other research using the three decision paradigm has investigated the linkage between performance and decision making involvement.

The initial data analysis using bivariate procedures indicated that decisional deprived participants were significantly different on various personality, demographic, affective, stress, and performance variables when compared to participants in a decisional equilibrium state. ANCOVA procedures partialling out the effects of age, job tenure, and project tenure changed the findings regarding the affective and personality variables. The results reveal differences between decisional deprived and saturated groups and the decisional equilibrium participants on two types of performance measures. Because performance is such a crucial factor, this finding is of significance. The immediate supervisors of the project engineers rated the overall performance of the decisional deprived and the decisional

saturated participants significantly lower than decisional equilibrium participants. When making the performance ratings, the supervisors had no knowledge of the reported decisional state of the participants. This, of course, is a subjective indicator of performance. However, even when a more objective performance cost measure was used, the decisional deprived and saturated participants had poorer indices.

The results of this study indicate that the degree of decisional deprivation is an important managerial issue. Participants experiencing high levels of deprivation reported high stress and were the poorest performers. Determining the degree of decisional deprivation would appear to be a worthwhile management practice. The study results also indicate that giving engineers too many decisions also could have some deleterious effects on performance. Although the study hypotheses focused primarily on decisional deprivation, the results suggest that decisional saturation also has some potential drawbacks. Therefore, the youngest and oldest, as well as the least and most tenured engineers, are experiencing some difficulties on a number of the variables studied. Both conditions, deprivation and saturation, appear to have costs that could be detrimental to an organization.

The results discount the alternative hypothesis that differences found may be attributed to a managerial policy of infrequently asking younger or less tenured employees to participate in decisions. As shown above, the actual number of decisions participated in by the deprived or youngest employees was similar to that of the equilibrium group ($M = 4.0$ versus $M = 4.1$, ns). It might be assumed that the more experienced engineers (older and longer tenure) would be the best performers. Again the results show that the saturated group, like the deprivation group, are the poorest performers. Yet, the saturation group (oldest and longer tenure) is participating in the most decisions ($M = 4.9$). These alternative explanations are weakened when one examines the similarities between the deprivation and saturation groups. These two groups, which are not in equilibrium, have lower attitudes, more stress, and poorer performance.

An important procedural step for determining the decision participation perceptions of managers is first to learn which decisions are considered important. Another recommendation would be the use of discussion groups or a survey of participants to determine individuals' feelings about participation in relevant decisions. The crucial starting point indicated by the present study is the accurate identification of relevant decisions. Relying only on supervisor judgments or questionnaire responses of what decisions are important or relevant appears to be an overly risky practice that could result in misguided managerial action. There is a need to supplement supervisor judgments and questionnaire responses with interviews, process observations, and other data collection approaches.

Despite a few differences in the present study results and those reported in the handful of investigations using the Alutto and Belasco (1972) model, there are many areas of agreement. When these new results

regarding physical stress and performance are added to previous results, certain managerial implications emerge. First, the Alutto and Belasco (1972) decision paradigm can be used to study the range of participation in decision making. It can be applied to examine decision makers in different settings; technicians, teachers, supervisors, and nurses already have been studied. One potential measurement problem involves the use of difference scores to categorize participants. Future research using the model should examine other measurement procedures for assessing the various conditions of PDM. Perhaps the difference method of categorizing can be compared with other methods of classifying in order to find the most valid method.

Second, managers need to be cautious about decisional deprivation among younger employees. If a manager at a relatively young age is decisionally deprived, he or she may never fully recover from this condition. That is, the negative attitudes and poor performance may become so ingrained that attempts by supervisors to correct these problems may be futile. Certainly, the age assumption needs to be longitudinally tested for each specific sample and setting before it can be accepted.

Third, the decisionally saturated employee should be studied carefully. In this study the oldest and most experienced project engineers were just as troubled as were the decisionally deprived or youngest and least experienced group. Over-participation appears to be as great a problem as under-participation for the engineers in this study. Given the potential problems of continued deprivation and saturation, it would be useful for managers in the firm in the present study to minimize the occurrence of either of these conditions.

Fourth, managers seriously considering methods of improving the quality of subordinates' work life should show some concern about stress producing conditions. The present findings indicate that decisional deprivation and saturation are associated with stress. Various forms of job stress are associated with coronary heart disease. The determination of how decisional deprivation and saturation interact with other job stressors or whether they themselves are forms of stress would seem to be a serious point of interest that requires proper management and further research and investigation within the context of organizations (Sales & House, 1971; Zaleznik, Kets de Vries, & Howard, 1977).

The results of the present study offer an extension of previous research by: (1) introducing a new procedure for generating the relevant decision situations; (2) examining additional personality, affective, stress, and performance variables; (3) using ANCOVA procedures that partial out the effects of demographics; and (4) studying a different occupational group of participants. Limitations exist, however. The study's design and the self-report nature of the majority of measures used prevent drawing any causal inferences. It could be argued that rather than variations in the degree of decisional participation influencing affective or stress variables, as suggested by some behavioral scientists, these variables are the cause of

the degree of PDM. Several factors could lead to this causal assumption. First, project engineers who are highly committed, internally motivated, and have positive attitudes toward the company might be more inclined to report a higher degree of decisional participation than would project engineers who are less committed, not internally motivated, and negative about the organization. In addition, supervisors of the project engineers may be more positively responsive to the suggestions of subordinates with more favorable job attitudes (Farris, 1969; White & Ruh, 1973). Additional research using longitudinal designs is needed to determine more carefully the causality of the relationships shown in this and other PDM studies.

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Some Correlates of Experienced Job Stress: A Boundary Role Study¹

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Bank branch employees and customers from 23 branches of a large commercial bank responded to questionnaires designed to assess issues regarding employee perceptions of management's orientation to service and employees' own orientation to service. A causal relationship was evidenced between service orientation discrepancy, role stress, and employee outcomes. Positive employee outcomes were found to be significantly related to customers' perception of service quality.

Employees of service organizations often occupy boundary roles (Adams, 1976). That is, these employees often are as close psychologically, organizationally (hierarchically and geographically), and physically to the organization's clients as they are to other employees of the organization, or perhaps even closer. Because of this boundary position, service employees function as information processors and filters (Aldrich & Herker, 1977), as representatives of the organization, and as formal or informal agents of the organization who influence the organization's clients (Thompson, 1967).

The relationships that service employees have with clients may be conceptualized to be a function of management's orientation to service (Crozier, 1964). Service orientation means the philosophy implied by (or attributed by others to) the policies, procedures, and goals of management. Adams (1976) and Schneider (1973), for example, noted that the

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degree of organizational control over, and trust in, incumbents of boundary positions, as well as incumbents' satisfaction with membership in the organization, are related to the nature of employee-client relationships and the outcomes of those relationships. The service employee's boundary-spanning role has many potentially negative outcomes associated with it. Miles (1976) demonstrated that the nature of boundary roles (intra- and inter-organization) is such that role incumbents experience relatively high levels of role conflict. More specifically, service employees in bureaucratic organizations who are required to serve both the system and clients or customers tend to experience role ambiguity and role conflict (Blau & Scott, 1962; Crozier, 1964; Kahn, Wolfe, Quinn, Snoek, & Rosenthal, 1964). In turn, role ambiguity and role conflict have been shown to be related to negative employee outcomes including job dissatisfaction, frustration, a lack of confidence in the organization (Kahn et al., 1964), and a propensity to leave the firm (Brief & Aldag, 1976).

The present authors would argue that, in addition to other possible sources, service employees experience role stress when they perceive management as primarily emphasizing system requirements that employees perceive to be in discord with client demands. In other words, the greater the discrepancy between perceptions of management and customer demands, the greater the experienced role stress. To the degree that management's service orientation is not in harmony with meeting customer needs, it would follow that managerial orientation in service organizations is a particularly critical issue with respect to organizational effectiveness vis-a-vis both the organization's customers and its employees (Steers, 1977).

SERVICE ORIENTATIONS

A managerial strategy that would appear to foster negative consequences for employees and customers in service organizations is a bureaucratic orientation (Bennis, 1970). Blau (1974) described bureaucratization in service organizations as a process by which energy is diverted from providing services to clients and applied to the creation and implementation of new rules and procedures. Merton (1940) called this "goal displacement," a process by which the goal of service is supplanted by the goal of system maintenance. Emery (1974, p. 9) has noted that because of their emphasis on the system as opposed to people, bureaucratic organizations convey a message to their employees and clientele "that *you* do not count, *you* can be rubbished, *you* are replaceable." In summary, then, a bureaucratic managerial orientation in service organizations may result in the organization's neglect of employees (Likert, 1967) and customers (Etzioni, 1964).

In contrast to the bureaucratic orientation, one may deduce from the above that service may be provided more effectively when managers in service organizations focus employees' efforts and attitudes toward

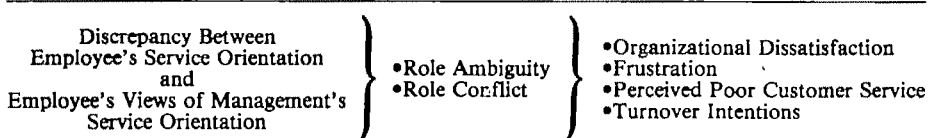
benefiting customers. It can be inferred from the literature noted above that, in order to accomplish this, managers should try to minimize "system vs. client" role dilemmas for service workers and provide a reward system conducive to employees' meeting customers' needs. In the present research, this kind of client-centered orientation is referred to as an *enthusiastic* orientation to service.

In an absolute sense, one might hypothesize that a bureaucratic managerial orientation to service should result in negative employee and, hence, customer outcomes. Furthermore, an enthusiastic managerial orientation to service should be reflected in positive employee and, thus, customer outcomes. Because of the boundary nature of service roles, however, it should be the *conflict* or incompatibility between what employees perceive management and customers to require that should result in negative employee outcomes, especially role ambiguity and role conflict.

Theoretically, it would be desirable to hypothesize that service employees of a commercial bank, reflecting their client orientation (Aldrich & Herker, 1976), would perceive themselves as being enthusiastic and management would perceive itself as being bureaucratic in their respective orientations to service. However, testing this hypothesis would require contrasting the responses to two different scales (the bureaucratic scale and the enthusiastic scale). Such interscale contrasts are appropriate only when normative data exist on the scales, but no such data are yet available on these measures (to be discussed below). Instead, *it was hypothesized that management would be perceived by employees as being more bureaucratic and less enthusiastic than employees viewed themselves*. This hypothesis permits contrasting responses to the same scale coming from the two response sets. In addition, as shown in Figure 1, *it was hypothesized that a discrepancy between each employee's orientation to service and his/her perception of management's orientation to service would be related to experienced role ambiguity and role conflict*. These role stress perceptions, in turn, would be related to employee dissatisfaction with the organization, feelings of frustration, a view that customers feel the quality of the service they receive is poor, and a propensity to leave the organization.

With respect to the employee-customer relationship, it was predicted that employee outcomes (especially service quality views) would be

FIGURE 1
Hypothesized Relationships Between Service Orientation
Discrepancy, Role Stress, and Other Employee Outcomes



positively related to customers' attitudes regarding the quality of service they receive in their bank branch.

METHOD

Sample

Data relevant to the major hypotheses were obtained from a sample of bank branch employees, including branch managers, from 23 branches of a large commercial bank. From an initial mailing of 496 questionnaires, only 20 usable returns were obtained (the request for branch identification was accidentally omitted from the form). A second mailing yielded 263 returns (53 percent), of which 243 were usable. Data analyses were accomplished on 263 returns (243 from the second mailing and the 20 usable returns from the first mailing). A check of means and variances in the two samples of returned surveys revealed no differences, and the proportion of male (39 percent) and female (61 percent) respondents to the second mailing closely approximated the distribution within the total available population.

Customer evaluations of the 23 branches were obtained from 1,655 customers (18 percent of the original stratified random sample mailing). The data from this sample are treated in detail in Schneider, Parkington, and Buxton (1977). For present purposes the focus of analysis will be on the service orientation discrepancy → employee outcomes → customers' attitude model described earlier.

Procedure

Both employee and customer questionnaires were developed on the basis of extensive interviews regarding perceptions of service in the bank branches. An attempt was made to use previously developed measures when appropriate and to develop new measures as needed. In both cases, items for the surveys were made system-relevant (Alderfer & Brown, 1972), i.e., banks and service were the foci of interest.

Employee Questionnaire—Role ambiguity and role conflict were assessed using a modified form of the Rizzo, House, and Lirtzman (1970) measure. Feelings of frustration were assessed with a one-item, 5-point scale that asked respondents to indicate how frequently they experienced so much frustration at work that it interfered with their ability to give good service (1 = seldom, if ever; 2 = sometimes; 3 = often; 4 = very often; 5 = almost always). Turnover intentions also were assessed with a one-item, 5-point scale that asked employees to indicate how strongly they felt about leaving or staying with the bank (1 = strongly inclined to leave, 2 = inclined to leave, 3 = don't know whether I want to stay or leave, 4 = inclined to stay, 5 = strongly inclined to stay). Employee perceptions of the quality of service given to customers in their branch were

assessed by asking them to indicate how they think the customers of the branch view the general quality of the service they receive in the branch (6 = outstanding, 5 = excellent, 4 = good, 3 = not so good, 2 = bad, 1 = terrible). Kunin's (1955) Faces scale (6 faces—3 positive, 1 neutral, 2 negative) was used to assess satisfaction with overall work experiences in the bank.

The bureaucratic orientation to service was assessed with six 3-point items; ten 3-point items represented the enthusiastic approach. Employees were asked to make two ratings for each of these 16 items: (1) how essential they felt the issues represented by the items were for giving good customer service and (2) how essential they thought each of the items was to bank management (i.e., branch system management, not just branch managers) as a feature necessary for giving good service.

Sample bureaucratic orientation items were:

1. Strictly following all rules and procedures of the bank.
10. Using only established methods for solving customers' problems.
11. Meeting sales quotas set for the branch by bank management at all costs.

Sample enthusiastic orientations were:

2. Keeping a sense of "family" among the employees within the bank.
7. Having cooperation among branch employees.
8. Having bank branches involved in community affairs.
15. Maintaining an emphasis on quality rather than quantity of service.

Two kinds of scores were created based on the two ratings of the 16 items. First, a discrepancy score across the 16 items was calculated for each employee using D^2 (Cronbach & Gleser, 1953). This discrepancy score is referred to as the service orientation discrepancy and represents the difference between the kind of orientation each employee thinks the bank should have toward service and the orientation the employee feels bank management thinks is essential for giving good customer service.

In addition to the service orientation discrepancy, four scale scores were created, two representing how bureaucratic and how enthusiastic employees feel the bank should be and two indicating how bureaucratic and enthusiastic employees feel management thinks the bank should be.

Customer Evaluation of Service Quality—Although the central focus of the present paper concerned the framework as presented in Figure 1, the conceptual orientation that guided the research clearly implied a relationship between server attitudes and the attitudes of those being served. Customer evaluations of service quality were obtained with a 6-point scale, the same scale used for employee attitudes about the service quality rendered.

The analysis of the relationship between employee and customer service quality evaluations were, of necessity, conducted using the *branch*

($N = 23$) as the unit of analysis. For these data, then, within-branch *average* employee and *average* customer perceptions were correlated across the 23 branches.

The purpose of the analysis, however, was not to show how customers and employees, as individuals, share perceptions, but how the average employee's work outcomes are reflected in the average customer's evaluations of banking service. That is, the focus in this analysis was on organizational effectiveness as judged by the typical or average perception of the organization by the organization's customers.

RESULTS

Results are presented in two sections: (1) The relationship between service orientation and employee outcomes and (2) The relationship between employee outcomes and customers' perception of service quality.

Service Orientation/Employee Outcomes

Tests of the first hypothesis, which predicted that management would be viewed as being more bureaucratic and less enthusiastic than the employees viewed themselves, are presented in Table 1; *t*-tests for dependent means were computed to test the prediction, and one-tailed tests of significance were used. Employees in fact viewed themselves as being significantly more enthusiastic than management ($t = 5.24$, $p < .001$); and management was rated significantly more bureaucratic ($t = 15.34$, $p < .001$) than the employees rated themselves.

TABLE 1
Employees' Views of Own Service Orientation
and
Employees' Views of Management's Service Orientation

	Employees' Views of Self		Employees' Views of Management		
	\bar{X}	σ	\bar{X}	σ	t
Bureaucratic	1.919	.382	2.334	.366	15.34, $p < .001$
Enthusiastic	2.483	.334	2.349	.382	5.24, $p < .001$

The second main hypothesis concerned the path relationships between the calculated service orientation discrepancy, role ambiguity and role conflict, and the various employee outcomes. This hypothesis was tested in two ways, both of which assess the necessity to include role ambiguity and conflict as intervening variables between the service orientation discrepancy and other employee attitudes.

First, using hierarchical regression analysis, each of the employee outcomes (e.g., satisfaction, frustration, etc.) was regressed on the service



orientation discrepancy index after both role ambiguity and conflict were entered into the regression equation. This procedure tests only whether the discrepancy-outcome relationships are eliminated when the effects of role ambiguity and role conflict are removed. This analysis revealed that the path relationships proposed in Figure 1 were completely true only when frustration was used as the criterion. In other words, when frustration was regressed on the service orientation discrepancy after removal of the role stress effects, the beta weight for the service orientation discrepancy index was nonsignificant ($F = 1.473$, ns). When satisfaction, employee service, quality views, and turnover intentions were used as criteria, the service orientation discrepancy contributed significantly to the prediction equations ($F = 11.095$, $p < .001$; $F = 9.638$, $p < .001$; and $F = 6.952$, $p < .005$, respectively) over and above the effects of role ambiguity and role conflict. These results indicate that there may be a direct path between the service orientation discrepancy and employee outcomes.

The second analysis involved assessing the degree to which removing the effects of role ambiguity and role conflict from the service orientation discrepancy results in a *reduction* of the discrepancy-outcome relationships. Thus, the discrepancy in service orientations, with the effects of role ambiguity and conflict parted out, was correlated with each of the outcomes, and the resulting part correlations were compared to the zero-order r 's. The significance of the difference between these correlations was determined by a modification of the asymptotic variance z -test (Bobko, 1977). The results of this analysis are displayed in Table 2, which shows a significant reduction in each relationship when the effects of role ambiguity and role conflict have been removed from the service orientation discrepancy. Therefore, although the hierarchical regression analysis shows that the service orientation discrepancy has an independent effect on all employee outcomes except feelings of frustration, the part correlation technique reveals that role ambiguity and conflict may be

TABLE 2
Comparison of Zero-Order Correlations Between Service
Orientation Discrepancy and Outcomes with Part Correlations
(Role Ambiguity and Role Conflict) of the Same Relationships

	Service Orientation Discrepancy γ	Service Orientation Discrepancy with Role Conflict and Role Ambiguity Parted Out γ	Difference
Organizational satisfaction	-.42*	-.18*	$p < .001$
Frustration	.33*	.07	$p < .001$
Turnover intentions	.32*	.16*	$p < .001$
Employee service quality views	-.37*	-.18*	$p < .001$

* $p < .01$

TABLE 3
Comparison of Bureaucratic and Enthusiastic Perceptions with
the Calculated Discrepancies as Correlates of
Other Employee Perceptions*

	Description of Self		Description of Management		Calculated Discrepancy	KR-14	\bar{X}	σ
	Bureaucratic	Enthusiastic	Bureaucratic	Enthusiastic				
Organizational satisfaction	.23**	-.21**	-.02	.24**	-.42**	a	3.919	1.338
Frustration	-.23**	-.04	-.06	-.15**	.33**	a	2.353	1.052
Turnover intentions	-.22**	-.12*	.09	-.13*	.32**	a	3.810	1.115
Employee service quality	.29**	.08	-.01	.37**	-.37**	a	3.422	.999
Role ambiguity	-.18**	-.29**	.00	-.21**	.29**	.71	1.471	.344
Role conflict	-.24**	.04	.04	-.26**	.45**	.69	1.950	.415
KR-14	.51	.76	.46	.76				

*a = single item scale

* $p < .05$

** $p < .01$

psychological mechanisms *through* which discrepancies in perceived service orientation result in negative employee outcomes.

It should be noted that some internal analyses of the data explored whether the discrepancy between self and management service orientations was required for testing the hypotheses or whether the simple bureaucratic or enthusiastic orientations themselves, being more straightforward, would be more useful. In four of six cases the data in Table 3 show that the discrepancy index was the strongest correlate of the other measures; in the other two cases the discrepancy is as highly correlated. KR-14 (Kuder & Richardson, 1937) internal consistency reliability estimates for the multi-item scales are shown in the margins of Table 3 along with the means and standard deviations of all the employee outcome measures.

Table 3 also shows that for the employees of this particular bank the more bureaucratically oriented they thought the bank should be, the more positive they tended to be about their work outcomes. In addition, the more enthusiastic they perceived management to be, the more positively they described their work outcomes.

Employee Outcomes/Customers' Perception

The correlations between employee outcomes and customers' service quality perception are displayed in Table 4. Positive employee outcomes (i.e., satisfaction with the organization and high employee service quality views) were significantly related to positive customer attitudes concerning the quality of service received. For the negative employee outcomes (i.e., frustration and turnover intentions), neither of the correlations reached significance.

TABLE 4
Correlations Between Employee Outcomes
and Customers' Service Quality Perception
(*N* = 23)

Employee	Customer Quality View
Organizational satisfaction	.41*
Frustration	-.26
Turnover intentions	-.36
Service quality views	.67**

**p* < .05

***p* < .01

DISCUSSION

The results of this study suggest that a calculated discrepancy between the way the bank's employees describe the kind of service orientation they

think the bank should have and the way they describe upper management's service orientation is strongly related to the way employees experience their work world. The larger this discrepancy, the more service employees experience role ambiguity and role conflict. The service orientation discrepancy and role stress perceptions, in turn, are related to organizational dissatisfaction, intentions to leave the organization, felt frustration, and feelings that the quality of service being offered to customers is low.

Although there is some evidence to support the causal sequence portrayed in Figure 1 (i.e., the service orientation discrepancy leads to greater role stress, which results in the other negative outcomes for employees), this conclusion is based on correlational analysis performed on concurrent data. Further longitudinal and experimental research is required to examine the proposed causal relationships among these variables.

It should be noted that it was the calculated *discrepancy* between the perceived orientations, not the perceived orientations themselves, that was the more important correlate of the other employee outcomes. One interpretation of this incompatibility between service orientations is that the discrepancy represents inadequate employee-organization integration. One may hypothesize that perceiving oneself as *more* bureaucratic and management as *more* enthusiastic are related to positive employee outcomes (see Table 3) because these views serve to increase an employee's feeling of integration with the organization. That is, viewing oneself and management in this light may result in a decrease in an employee's psychological distance from management.

Although incompatible role demands may always be present to some degree in service boundary roles, the levels of experienced role stress, as well as other employee outcomes, may be amenable to organizational intervention. It is true that altering the levels of role stress and other outcomes may not decrease the correlation between them; i.e., one can change the absolute level of two variables without affecting the correlation between them. However, once it is known that role stress and other employee outcomes are related, the critical issue becomes the *level* of experienced role stress, for it seems to be role stress that is meaningful psychologically to the individual. Although in the present study it is not possible to show statistically whether role stress and employee outcomes are at levels at which the bank need be concerned, the authors' clinical impression, based on the extensive employee interviews described earlier, confirms the meaningfulness of the relationships reported.

Through alterations of policies, procedures, and goals it may be possible for management to effect changes in the degree to which there is emphasis on an enthusiastic service orientation more similar to that of boundary personnel. This should reduce the levels of role stress and the levels of negative employee outcomes and should increase the levels of positive employee outcomes. An alternative intervention strategy may be by way of personnel selection. It may be possible to select service

employees whose orientation to service is more similar to management's. However, staffing efforts that lead to a service climate in which customers are neglected by employees might be dysfunctional to organizational effectiveness.

The strong relationship between employees' and customers' view of service quality suggests that on the "front lines" of a service organization there is a sharing of perceptions about the organization's accomplishments. With the exception of employees' satisfaction with the organization, the lack of strong relationships between employees' outcomes and customers' perception of service quality may indicate that altering the levels of employee outcomes may not have profound effects on customers. This probably is true because there are many other possible sources of customers' attitudes regarding a service organization in addition to their relationships with boundary personnel. In the organization under study some of these sources may include, for example, bank branch location, the nature of the services offered by competitive banks, computer errors in accounts, and interest rates.

In addition to using longitudinal and experimental designs, future research should attend to other issues:

1. There is a need to assess the impact of an enthusiastic managerial service orientation on a variety of job performance dimensions and to assess the relationship between service employees' performance on these various dimensions and customer perceptions of service quality.

2. It would be of value to assess the utility of an enthusiastic managerial orientation for boundary role persons across service firms as well as for boundary roles that have little to do with the provision of services (e.g., a production manager who functions as an organizational linking pin).

A better understanding of the inherent demands of boundary roles in service organizations is critical because service industries now are the dominant employers in the United States.

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*Retirement and Life Satisfaction*¹

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Demographic, personality, and job related correlates of life satisfaction and satisfaction with retirement associates, work and activities, and finances are reported for recently retired Civil Service employees. Health was found to be an important determinant of satisfaction in retirement. Satisfaction with previous job and the perception of being forced to leave work also were related to satisfaction in retirement. Self-esteem and locus of control were significantly correlated with retirement satisfaction, and particularly with overall life satisfaction.

It has been nearly ten years since the publication of Smith, Kendall, and Hulin's monograph (1969) describing the construction of scales to measure satisfaction in work and retirement. Almost all issues of journals publishing industrial/organizational research include articles that treat job satisfaction as an independent or dependent variable, but relatively little attention has been directed to satisfaction in retirement. Retirement satisfaction assumes increased personal and organizational significance for several reasons. Because of continuing increases in life expectancies and the possibility of early retirement, retired individuals comprise a larger number and proportion of our population, and these individuals face longer retirement periods. The impact on organizations and society in general should increase as pension and social security costs mount. In addition, the abandonment of compulsory retirement ages makes the prediction of retirement an important issue for those responsible for maintaining a qualified work force. A systems view of the retirement issue and its implications has been provided by Walker and Price (1976).

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The research reported in the present paper was directed to a determination of what demographic variables, job perceptions, and personality characteristics are correlated with satisfaction in retirement. Early theoretical work stressed the importance of the worker role as a source of identity and status (Friedmann & Havinghurst, 1954; Maddox, 1966; Miller, 1965). These authors generally assumed that most American workers have a strong commitment to work which is manifested in a resistance to retirement. This orientation would suggest that satisfaction and adjustment to retirement would be negatively correlated with job involvement (Lodahl & Kejner, 1965) and perhaps with job satisfaction.

Recent research indicates that this may not be the case. Simpson, Back and McKinney (1966) and Atchley (1972) found no relationship between commitment to work and attitude toward retirement. Barfield (1970) and Barfield and Morgan (1969) investigated determinants of the decision to retire and retirement satisfaction among auto workers and a national sample. Although work-oriented, motivational variables were related to retirement satisfaction significantly and in the expected direction, situational factors such as poor health and inadequate income related highly to satisfaction in retirement. Glamser (1976) reported that workers who were relatively happy with finances, friends, social activity, and their level of preparedness for retirement were more likely to have a positive attitude toward retirement. Finally, Smith et al. (1969, p. 132) reported that people are about equally satisfied in retirement as in work. This would mean that the hypothesis suggested above concerning a negative relationship of retirement satisfaction to job commitment may not only be nonexistent, it may be actually positive.

With the exception of the Barfield (1970) and Smith et al. (1969) studies, empirical data concerning the relative importance of various factors to retirement satisfaction are unavailable or come from very small samples. The present study represents an attempt to provide data concerning retirement satisfaction and its correlates. All retired personnel of the Michigan Civil Service for a two year period ending in July 1977 were asked to respond to a questionnaire package. Overall life satisfaction as well as satisfaction with associates, work and activities, and finances were treated as dependent variables. Job perceptions, needs, demographic and work experience variables, and personality characteristics were treated as independent variables. The major objective was the determination of the relative importance of these variables for retirement satisfaction.

METHOD

Subjects

All individuals who had retired from Michigan Civil Service employment for a two year period ending in July 1977 were asked to participate in

the study. Of the total of 752 retirees, 353 completed the mailed questionnaire package. Of these 353 retirees, 46 percent or 163 were females, and 190 were male. Of the total possible group (752), 44 percent were female. A χ^2 test indicated that there were no significant differences between respondent and nonrespondent groups in terms of the department in which they worked ($p > .05$). The difference between respondents and nonrespondents in terms of the geographic location (the state capitol plus the major metropolitan area versus all others) of their work place was also nonsignificant ($p > .05$). Because of the anonymous nature of the study, no follow-up was possible, and certainly it is plausible that the respondent-nonrespondent groups did differ in ways that it was not possible to evaluate.

Questionnaire Measures

Personality, Job Perceptions, and Needs—Perceptions that the subjects had concerning their previous jobs were measured by the short form of the Minnesota Satisfaction Questionnaire (Weiss, Dawis, England, & Lofquist, 1967), which consists of 20 items concerning satisfaction with various extrinsic and intrinsic work factors. Responses to items in this scale were made on a strongly agree to strongly disagree continuum with a Likert type format. Extent of subjects' involvement in their previous jobs was measured by a 4-item scale with a similar format. This scale has been used by Rabinowitz, Hall, and Goodale (1977). It should be pointed out that the retirees perceptions of their jobs were retrospective. Consequently, attributional problems are significant and should not be ignored in making statements concerning the determinants of a retirement decision. However, whether a subject gives positive reports about his/her past job experiences after retirement may be an important indicant of life and retirement satisfaction.

Psychological needs or motivation were assessed by three scales presented by Alderfer (1972). The *existence* needs measure includes items assessing the importance of pay, security, and fringe benefits. Items dealing with the desire to be with and be accepted by others make up the *relatedness* needs dimension. The *growth* needs measure consists of items concerning the importance of prestige, growth opportunities, and self-esteem. Responses to items in these three scales were made on 5-point Likert type scales based on a very desirable to very undesirable continuum. Alderfer (1972) presented predictive and construct validity data for these measures. In the current study, the internal consistencies of these measures were .80, .74, and .79 for existence, relatedness, and growth needs, respectively. Measures of two personality constructs that appear to be affected by the type of work experiences one has and that also relate to retirement satisfaction were included. Self-esteem has been found to affect vocational choice and work performance in a variety of work related contexts (Korman, 1977). In the present study, self-esteem was measured by

Rosenberg's measure (1965). Rosenberg (1965) has reported considerable evidence of this scale's construct validity and reliability. Internal consistency of the measure in the present study was .79; Rosenberg reports a Gutman reproducibility coefficient of .92. Self-esteem was measured by a 10-item scale; responses to each item were made on a 5-point strongly agree to strongly disagree continuum. Locus of control was assessed by an 11-item work-related version of Rotter's scale (1966). Using this operationalization of the locus of control concept, Andrisani and Nestel (1976) found that persons' beliefs concerning the degree of personal control over events both determined and were determined by their work experiences.

Reasons for Retiring—Because retirement with full pension was possible at age 55 after 30 years of service, many (250) of the retirees in our sample were less than 65. It would be safe to assume that the reasons for retirement differed among these people. Thus respondents were asked to indicate the importance of six possible reasons for retirement on a 4-point scale ranging from extremely important to of no importance. These six reasons included bad health, desire to travel or pursue hobbies, desire to be with family and friends, a very good pension, dislike of my job, and opportunity to take a new part or full time job I like better than my other job.

Work Experience—Five questions concerning work experience were asked: the number of jobs respondents had held since high school, the age at which they obtained their first full time job, the number of times they voluntarily left a job, the number of times they were forced to leave a job, and the length of time they held the job from which they retired.

Demographic, Income, and Health Variables—Population of the community in which they lived, length of time lived in that community, age, sex, education, job level, race, and marital status were included in this set of variables. Information on two variables that could impact on the adequacy of retirement income, and hence on retirement satisfaction, was collected. These two variables were the number of dependents the respondent had and whether or not the respondent's spouse worked. Respondents' health was operationalized as the sum of three items: a subjective rating of general health on a 4-point scale ranging from excellent to poor, an item asking how often they visited a physician in the past year, and an item asking how often they had been forced to change plans because of illness in the past year. High scores on this index, then, are evidence of subjectively reported poor health and frequent visits to a doctor. Hence negative correlations with the dependent variables are expected. Finally, respondents were asked to indicate their average weekly income from all sources.

Dependent Variables—Retirement satisfaction was measured by the satisfaction with finances, satisfaction with associates, and satisfaction with work and activities subscales of the Retirement Description Questionnaire (Smith et al., 1969). The fourth subscale, satisfaction with health, was not used because perceived health was one of the independent variables. A fourth dependent variable was a measure designed to assess

TABLE
Internal Consistency and Reliability of

	1	2	3	4	5	6	7	8	9	10	11	12	13	14
Job satisfaction (1)	(.90)													
Job involvement (2)	.31	(.77)												
Existence needs (3)	.18	.08	(.80)											
Relatedness needs (4)	.22	.03	.63	(.74)										
Growth needs (5)	.27	.22	.66	.63	(.79)									
Self esteem (6)	.16	.07	.21	.15	.30	(.79)								
Locus of control (7)	.30	.11	.16	.18	.24	.32	(.70)							
Bad health (8)	-.03	.01	.03	-.07	-.03	-.07	-.10	---						
Travel or hobbies (9)	.08	-.08	.19	.15	.14	.18	.07	.00	---					
Family and friends (10)	.06	-.10	.19	.14	.11	.21	.11	-.05	.41	---				
Good pension (11)	.17	.06	.10	.11	.08	.00	-.03	-.01	.26	.20	---			
Dislike of job (12)	-.37	.01	-.02	-.09	-.02	-.13	-.12	.05	-.07	-.12	-.06	---		
Desire for new job (13)	-.26	-.02	-.01	-.04	.01	-.07	.06	-.02	-.14	-.09	-.05	.34	---	
Number of jobs (14)	.07	.04	.03	-.05	.05	.00	-.01	.12	.06	.13	.02	-.06	-.08	---
First job-age (15)	-.11	-.10	.00	.05	-.13	-.04	-.09	-.08	.08	.03	-.03	.03	-.13	-.37
Voluntary turnover (16)	.11	.10	.01	-.02	.06	.08	.10	.09	.02	.00	-.09	-.08	-.14	.76
Forced turnover (17)	.02	-.03	.05	-.02	-.04	-.06	-.08	.10	.00	-.02	.07	-.09	-.08	.36
Length of time in job (18)	.03	.09	.11	.08	-.06	.06	-.11	.10	.09	.04	.13	-.09	-.07	-.17
Pop'n of community (19)	.02	-.03	.00	-.01	.04	-.01	.01	.13	-.09	-.07	.02	.03	.18	-.04
Time in community (20)	.01	.07	.02	.00	-.02	.03	-.06	.01	.03	.11	-.01	-.10	-.04	-.09
Age (21)	.20	.08	.02	-.02	.00	.04	.00	.06	.11	.05	.09	-.29	-.26	.17
Sex ^b (22)	-.07	-.20	.05	.00	-.03	.01	.00	-.13	-.01	.04	-.17	.03	-.20	-.07
Education (23)	.11	.11	-.03	.07	.21	.13	.01	.03	.13	-.10	-.03	.09	.09	.07
Job level (24)	.24	.24	-.09	.04	.16	.18	.06	-.03	.05	-.03	.13	.00	.07	.00
Race ^c (25)	.04	.04	-.05	.00	.02	-.02	.01	-.11	.03	.11	.15	.04	.05	.04
Marital status ^d (26)	.15	-.63	-.04	-.02	.00	.16	.07	.00	.07	.16	-.01	-.10	.08	.08
Employed spouse ^e (27)	-.08	.07	-.11	-.02	-.02	-.05	-.08	.12	-.07	-.05	-.14	.09	.13	.05
Dependents (28)	.01	.08	-.07	-.01	.05	.03	.06	.02	-.13	.04	.01	.09	-.07	.02
Health (29)	-.12	-.04	.04	-.15	-.02	-.10	-.09	.53	-.02	-.06	-.13	.02	-.04	.03
Income (30)	.06	.12	.02	.00	.13	.13	.05	-.01	-.02	-.15	.09	.04	.24	.01
Satisfaction-finances (31)	.17	-.01	.02	.14	.14	.14	.16	-.23	.18	.04	.17	-.16	-.05	.03
Satis. associates (32)	.12	-.06	.02	.17	.07	.15	.22	-.15	.09	.14	.03	-.21	.01	-.05
Satis. activities (33)	.32	-.05	.09	.14	.07	.15	.18	-.20	.31	.13	.14	-.18	-.07	-.03
Life satisfaction (34)	.25	.04	.09	.16	.13	.39	.33	-.13	.10	.17	.11	-.21	-.06	.02

*Values in parentheses on the diagonal represent coefficient alphas. Those items for which there is a blank space are single item variables for which no internal consistency estimate could be computed.

^bMales were scored 1, females 2.

^cNonwhites were scored 1, whites 2.

^dSingle was scored 1, married 2.

^eEmployed spouse was scored 1, others 0.

general life satisfaction (Gurin, Veroff, & Feld, 1960). Subjects responded to the five items in the scale on a 5-point basis ranging from almost always true to never true.

Data Analysis

Stepwise regression analyses of the predictor variables on each of the dependent variables were computed. Because previous research had indicated the primary importance of adequate income and good health for retirement satisfaction, these variables were entered first into each of the regression analyses. The regression analyses, then, were designed to test the importance to retirement satisfaction of factors above and beyond money and health.

The stepwise decision criteria for entry of additional variables into the regression equation included a maximum of 15 predictors, an *F* value of 2.00, and an additional percent variance accounted for of .005. These values may be somewhat liberal, but they do seem consistent with the general exploratory purpose of the present research.

RESULTS AND DISCUSSION

The internal consistency reliabilities and intercorrelations of the independent and dependent variables are presented in Table 1. Several

1

Independent and Dependent Variables*

15	16	17	18	19	20	21	22	23	24	25	26	27	28	29	30	31	32	33	34
-.24	---																		
-.09	.17	---																	
.04	-.13	.02	---																
.07	-.06	.00	-.04	---															
.11	-.11	.00	-.09	.21	---														
.07	.12	.23	.17	.10	.23	---													
.18	.02	-.06	-.07	-.02	.09	.03	---												
.11	.11	-.12	.08	.28	-.02	.06	-.10	---											
.22	.05	-.12	-.02	.29	-.07	-.05	-.30	.54	---										
-.11	.08	-.05	.04	-.18	-.11	-.05	-.02	-.08	.03	---									
-.18	.02	.00	.08	-.08	-.16	-.25	-.43	-.03	.22	.04	---								
-.10	.00	-.07	.05	.03	-.08	-.29	.05	-.03	-.00	-.05	.29	---							
-.10	-.03	.00	.02	.05	-.07	-.27	-.62	.08	.28	.03	.38	.04	---						
-.08	.03	.10	.03	-.11	.03	.06	.10	-.04	-.10	-.20	-.10	.07	-.15	(.77)	---				
.02	-.04	-.11	.01	.19	.13	.04	-.16	.22	.22	-.02	-.07	-.10	.11	.02	---				
.04	.07	-.02	.03	.06	-.01	.11	-.06	.30	.24	.05	-.02	-.27	.03	-.16	.05	(.79)	---		
.01	-.03	.05	-.05	.04	-.02	.04	-.01	.06	.10	.02	.01	-.08	-.06	-.10	.07	.22	(.86)	---	
.02	-.06	-.02	-.03	-.10	-.06	.01	-.05	.02	.02	.07	.09	-.03	.03	-.32	-.11	.28	.38	(.82)	---
.01	.07	-.15	.02	-.07	-.07	.12	.05	.01	.07	.10	.13	-.04	-.03	-.26	.01	.26	.25	.32	(.85)

correlations with the dependent variables are substantial ($> .20$) given the nature of the data, and because of the relatively large sample size, most are statistically significant (with $N = 353$, $r > .106$, $p < .05$). Job satisfaction tends to correlate highly with all four dependent variables. Locus of control and self-esteem are moderately correlated with the retirement satisfaction measures and quite highly correlated with overall life satisfaction. At the same time, locus of control and self-esteem are not correlated with health and income. Although these data were collected at one point in time, it does appear that individuals who are happy with their jobs are happy with themselves, and they also report greater satisfaction with life. Age is negatively correlated with retirement and life satisfaction, as is the statement that bad health is the major reason for retirement. Internal consistencies for those measures that were scales were all above .70 and were considered satisfactory.

The intercorrelations among the predictor variables were generally less than .20, which means that multicollinearity should not be a serious problem in the regression analyses described below. The only exception was the moderately high correlations among the job perception and motivation variables. This multicollinearity did produce a suppressor effect (negative regression weight and positive zero-order correlation) in the analysis of satisfaction with associates in retirement described below. In addition, an examination of each of the partial correlations in each of the steps of the

stepwise solution did not seem to indicate that multicollinearity was a serious problem.

The stepwise regression analysis on the satisfaction with associates in retirement is presented in Table 2. Only three of the variables in the entire set contribute significantly to satisfaction with retirement associates. Neither income nor health seems to make much difference, and the multiple R of .404 is relatively low. Retirees who state that dislike for their job was an important reason for quitting are less likely to be happy with their associates in retirement. People who felt they were in control of events affecting them were more likely to be happy with this aspect of retirement. The negative β for growth needs indicates those people with high growth needs are not as satisfied with their associates as are those with low growth needs; people with high relatedness needs, however, are more likely to be happy. These two predictors are highly correlated. Consequently the interpretative problems associated with multicollinearity make clear-cut statements about the relationship of existence and relatedness needs and retirement satisfaction difficult.

TABLE 2
Results of Stepwise Regression Analysis on Satisfaction
with Associates in Retirement

<i>Step</i>	<i>Variable(s) Entered</i>	β	F_{entry}^a	R	F_{MR}^a
1	Income	.095	1.206		
	Health	.038	2.156	.120	1.659
2	Quit because of dislike of job	-.165	10.840*	.243	4.767*
3	Locus of control	.186	7.973*	.302	5.678
4	Relatedness needs	.268	3.356	.324	5.261*
5	Growth needs	-.266	7.275*	.364	5.719*
6	Quit because of bad health	-.128	2.775	.379	5.337*
7	Quit to be with family and friends	.112	2.620	.392	5.032*
8	Education level	.106	2.620	.404	4.796*

^a F_{entry} refers to the F -test associated with the addition or deletion of a variable; F_{MR} is the F -value associated with the multiple R .

* $p < .05$

In Table 3, the results with respect to satisfaction with finances are presented. Somewhat surprisingly, the level of income seems to have little to do with financial satisfaction. Health problems, which probably mean financial problems, are associated with financial satisfaction. Level of education is quite highly related to financial satisfaction. People with employed spouses are less likely to be happy with their financial situation, suggesting that these people may be working because they are forced by lack of adequate retirement income. That that is true is further suggested by the fact that the importance of bad health and dislike of job in the decision to retire are negatively related to satisfaction while the stated importance of a good pension is positively related to financial satisfaction.

TABLE 3
Results of Regression Analysis on Satisfaction with
Finances in Retirement

Step	Variable(s) Entered	β	F_{entry}^a	R	F_{MR}^a
1	Income	-.060	.561		
	Health	.018	5.731*	.163	3.117*
2	Education	.326	20.916*	.330	9.232*
3	Employed spouse ^b	-.201	18.021	.418	11.948*
4	Quit because of bad health	-.208	8.232*	.451	11.511*
5	Quit because of dislike of job	-.141	7.425*	.479	11.104*
6	Quit because of good pension	.154	6.079*	.500	11.602*
7	Locus of control	.110	3.487	.511	9.816*

^a F_{entry} refers to the F -test associated with the addition or deletion of a variable; F_{MR} is the F -value associated with the multiple R .

^bEmployed spouse was scored 1; others 0.

* $p < .05$

TABLE 4
Results of Regression Analysis on Satisfaction
with Activities and Work in Retirement

Step	Variable(s) Entered	β	F_{entry}^a	R	F_{MR}^a
1	Income	-.104	2.590		
	Health	-.280	26.899*	.340	14.886*
2	Quit to pursue hobbies or travel	.272	26.393*	.456	19.827*
3	Job satisfaction	.324	23.354*	.531	22.173*
4	Job involvement	-.122	4.686*	.545	18.965*
5	Number of voluntary job turnovers	-.087	2.401	.551	16.302*

^a F_{entry} refers to the F -test associated with the addition or deletion of a variable; F_{MR} is the F -value associated with the multiple R .

* $p < .05$

Planned retirement rather than a forced departure might be the major determinant of satisfaction with one's monetary status.

The results of the regression analysis on retirement satisfaction with work and activities are presented in Table 4. Of the two variables whose entry into the regression equations was forced, health appears to be very important. Ill health is apparently keeping some people from doing the things they would like to do. Again people who quit work for a positive reason (to pursue hobbies or travel) appear to be the happiest. People who expressed a high degree of satisfaction with their last job were also happy with what they were doing in retirement. However, people who expressed a high degree of involvement in their job were less likely to be satisfied with retirement activities. The job involvement variable may be acting as a suppressor. Its zero order r is $-.05$, and its correlation with job satisfaction is $.31$. Individuals who are happy with work tend to be happy with retirement; but if their work is the central thing in their lives, they will find retirement activities less than satisfying.

TABLE 5
Results of Regression Analysis on Life Satisfaction

Step	Variable(s) Entered	β	F_{entry}^a	R	F_{MR}^a
1	Income	-.001	.084		
	Health	-.198	16.042*	.257	8.046*
2	Self-esteem	.286	38.667*	.449	19.139*
3	Locus of control	.185	12.004*	.492	18.051*
4	Quit because of dislike of job	-.126	5.772*	.511	15.900*
5	Forced job turnovers	-.136	3.275	.521	13.930*
6	Age	.137	3.414	.532	12.557*
7	Length of time lived in present community	-.109	3.416	.542	11.533*

^a F_{entry} refers to the F -test associated with the addition or deletion of a variable; F_{MR} is the F -value associated with the multiple R .

* $p < .05$

The last regression analysis, reported in Table 5, involved overall life satisfaction. Health again was an important factor. Income appeared to make no difference. Major correlates of life satisfaction were the self-esteem and locus of control variables, both assumed to be relatively stable personality characteristics. For the retiree subjects in this study, it would seem that overall satisfaction with their status in life meant a positive view of themselves and the belief that they can control and have controlled events that affect them. The negative weight for the importance of disliking one's job in the retirement decision also fits this interpretation. Also relevant are the relatively high correlations between these same two variables and job satisfaction. An important question concerns the development of this positive view of life. What causes high job satisfaction, self-esteem, locus of control, and life satisfaction? A longitudinal study of entire life spans would be the ideal approach. In the present study, some of the demographic statistics and work experience variables may provide a clue. The correlations of these variables with life satisfaction were uniformly low; however, the correlations with importance of family and friends, the number of forced job turnovers, and one's marital status were significant statistically.

CONCLUSIONS

The data presented in the present study document the importance of health in satisfaction with one's retirement status and overall life satisfaction. Income does not appear to be nearly as important, though the population studied tended to have reasonably good retirement incomes. The idea that high job involvement means dissatisfaction with retirement was partially supported by the data regarding satisfaction with retirement activities. However, far more important seems to be a general positive attitude concerning job and retirement.

Future longitudinal research efforts should be directed to determination of the factors important in the development of this attitude. Finally, the

perception that one is forced to retire unexpectedly for whatever reason seems to be associated with less than satisfactory retirements. Preparation for retirement in terms of both finances and planned activities may produce more retirement satisfaction.

The major limitation of the present study lies in its cross-sectional design and the resultant attributional problems. Although the results of the present study are remarkably similar to those reported by Barfield and Morgan (1969) and Barfield (1970) for a national sample and a sample of auto workers, it should be noted that results of the present study are based only on the group of state civil servants who responded to the questionnaire. As such, the possibility of sample bias is very real and the study's external validity must be considered uncertain with respect to both the subpopulation of retired workers sampled (civil servants) and any more general population of retirees.

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The Scanlon Plan: Causes and Correlates of Success

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The Scanlon Plan (SP) is a systematic approach to enhancing organizational effectiveness through a formal participation program and a financial bonus. It has met with varying degrees of success. The present study is an investigation of factors that account for this variation in success. SP success was found to be positively related to the average level of participation in decision making reported by employees, to the number of years a company had had an SP, managerial attitudes, chief executive officer's attitudes, and expected level of SP success; but not related to company size.

The Scanlon Plan (SP) had its beginnings in the depression. On the advice of Steelworkers' Vice President Clinton Golden, Joe Scanlon, as local union president of a financially troubled steel mill, led a successful effort to enlist the employees' help to salvage the company and maintain employee wages. The success of this effort led to Joe Scanlon's taking a position with the Steelworkers and using this new approach to help other small financially troubled companies. However, the major impetus that really got the plan going was its success in the Adamson Company. Up until this time the approach had been used to alleviate crisis situations. But Adamson was a profitable company and the president wanted the plan to improve an already healthy company rather than to avert a crisis. The plan was begun at Adamson on January 1, 1945, and the company ended the year with a 46 percent increase in "productive efficiency." Douglas McGregor became aware of Adamson's success and persuaded Joe Scanlon to join the Industrial Relations Staff at M.I.T. Jack Ali, union president at Lapointe Machine Tool Company, and Ed Dowd, executive VP of the company, read a *Life* article (Chamberlain, 1946) about Adamson's success and tracked down Joe Scanlon at M.I.T. On December 1, 1947, the SP was implemented at Lapointe. It was very successful and was described to the business world in what is probably the best known article on the SP, "Enterprise for Every Man" by Russell Davenport (1950).

Scanlon died in 1956 and McGregor died in 1964, but their work has been carried on.

The basic principle underlying the SP is that present in the work force is a reservoir of creativity and experience that, if properly tapped, has the potential to greatly increase productivity. The SP uses two structures to try to realize this potential—a financial bonus and a mechanism for employee participation. The bonus typically is based on savings in payroll costs in proportion to the historical ratio of payroll costs to sales value of production. After setting aside a portion to cover deficit periods, the bonus is paid out to *everyone* as a percentage of base pay. The employee participation that earns them the bonus is accomplished by increased employee influence in the immediate job situation, and a two tier committee system for processing those suggestions that involve more than just the individual's job. In many ways the SP is a forerunner to "organizational development" (OD) with its emphasis on participation, employee involvement, and teamwork. Unfortunately much of the published literature portrays the SP as just a wage incentive system. However, this emphasis is not representative of the early practice of Joe Scanlon and Douglas McGregor, who always incorporated a strong behavioral component. Nor is it the case in most of the midwestern SP companies where the plan is viewed as an organizational change process and in companies where in recent years it has been successfully integrated with some of the newer approaches to OD, particularly team building activities. However, the SP is unique in its systematic and balanced use of both financial and nonfinancial approaches to increasing organizational effectiveness.

The SP has expanded slowly and steadily, but given the great variety of Scanlon-type Plans, it is impossible to get accurate estimates of its extent. However, it is readily apparent both from the published studies and from the author's acquaintance with numerous midwestern SP companies that there is considerable variance in the success of the SP. It does not seem an unrealistic estimate that the SP has been abandoned in about as many cases as it has been retained. The purpose of this study was to identify some of the factors that account for this variation in success.

SCANLON PLAN LITERATURE

Reviewing the SP literature is a difficult process. Unlike other approaches to organization development that have an academic base, the SP had its origins in actual practice and it is virtually void of theory. A few attempts have been made to integrate the SP into the professional organization behavior literature. McGregor saw the plan as a mechanism for implementing his Theory Y assumptions and devoted a whole chapter of his classic text (1960) to a discussion of the SP. Katz and Kahn (1966) and Strauss and Sayles (1957) discussed the SP at some length in an organization behavior (OB) context. Similarly, Goodman (1973) suggested a theoretical framework based on an expectancy model of motivation.

However, the only major theoretical treatment devoted to the plan is that of Frost, Wakeley, and Ruh (1974). They present a conceptual model based on the concepts of *identity* (the uniqueness of the organization and each of its members), *participation*, and *equity*, with the later addition of *managerial competence*. Although this model provides a useful framework for understanding SP structures and processes, the concepts are not easily operationalized and do not lend themselves readily to the generating and testing of hypotheses.

Although the SP theory is weak, the availability of professional-quality empirical investigations that relate to SP success is even weaker. However, this problem is not limited to SP research. It is true of interorganizational research in general. As Graham and Roberts conclude in their text *Comparative Studies in Organizational Behavior*:

At present there is a dearth of interorganizational field research in contrast to the vast quantity of single organizational studies. . . . such studies are rare because they are expensive in time, effort, and money. No longitudinal investigations are presented [in the text] because few good ones exist (1972, pp. 131-132).

Certainly this time/effort/money argument is a major limitation. The American academic reward system is not supportive of large scale interorganizational research projects such as Joan Woodward's classic study (1965). Yet other factors contribute to this situation. The current organizational literature contains a strong individual psychological orientation with its own methodological biases. When these biases are carried over into interorganizational research they create unrealistic expectations (design, sample size and representativeness, statistical significance) and serve to discourage such research in refereed journals. As a result there tends to be a split in the literature. A lot of rigorous, quantitative, but sometimes trivial studies in the academic journals, and rich, qualitative, but often unsystematic and biased articles in the more popular periodicals. This is certainly the case for SP research. Although numerous professional empirical articles focus on aspects of the SP, only two such studies were identified that focus specifically on the SP and its success. Wallace (1971) and Ruh, Wallace, and Frost (1973) hypothesized and found that managerial attitudes toward participative management policies correlated significantly with whether or not the SP was retained or abandoned. Greenwood (1977) attempted to operationalize the Frost et al. (1974) model of SP effectiveness. Two companies (judged to be on opposite ends of the SP effectiveness continuum) were contrasted on 25 subdimensions of the four core constructs. The results, in terms of both company differences and the validity of the constructs, were inconclusive.

Most of the remaining studies are subject to one or more of the following criticisms: (1) They are individual company studies of unknown generalizability (often case studies void of data), (2) there is a blatant pro or anti SP bias that obscures intelligent discussion of the causes of SP success and failure, and (3) they are summary tabulations based on secondary sources of information.

However, this is the only literature available, and on the basis of it and the author's personal experience with several midwestern SP companies, an attempt was made to identify the variables that contribute to the success or failure of the Scanlon Plan. For the purposes of this study, SP success is defined as:

The extent to which the full effort, experience, creativity, and innovative ability of the entire work force through the use of the SP is directed toward increasing the organization's total effectiveness.

Prevalent throughout the literature is the premise that a high level of employee participation in decision making (PDM) is essential to SP success: "A consistent theme running through the results of all the studies is the central role of PDM in the implementation of the Scanlon Plan. . . . The emphasis placed on PDM. . . . is not misplaced" (Frost et al., 1974, p. 183). However, although high levels of participation would seem to be a necessary, they would not appear to be a sufficient condition for SP success. The literature was reviewed to identify (1) the relationship between participation and SP success, (2) factors that contribute to participation and SP success, and (3) factors needed to supplement participation in order to achieve success.

No evidence was found to contradict the assumption about the central role of participation. All cases described as successful were characterized by a high level of participation. Conversely, the unsuccessful cases *tended* to be characterized by a low level of participation.

Three groups of variables that related to SP success were identified:

1. Situational factors. The variable most frequently suggested as limiting the potential of the SP is *size* and, indeed, in spite of some data to the contrary (Lesieur & Puckett, 1968), it is a prevalent assumption that the SP is appropriate only for very small organizations (Helfgott, 1962). *Technology* also has been frequently suggested as contributing to SP success. The basic argument is that where there is extensive technology the potential for employee participation is less and hence the usefulness of the SP is reduced (Helfgott, 1962). Another variable in this category is the *managerial climate*, particularly the extent to which managers are rewarded for fostering employee participation (Wallace, 1971).

2. Personnel characteristics. Several personnel characteristics have been suggested as critical factors in the plan's success: (1) the attitude of the CEO (Gilson & Lefcowitz, 1957; Helfgott, 1962), management (Moore & Goodman, 1973; Schultz, 1958; Wallace, 1971), and particularly foremen (Strauss & Sayles, 1957; Whyte, 1955) toward the plan and toward participation in general; (2) background characteristics of the work force—experience, skill, tenure, sex, importance of work (Gilson & Lefcowitz, 1957; Helfgott, 1962); and (3) expectations of success/failure before the plan is begun (Schultz, 1958).

3. Process variables. The above two groups of variables can exist independent of the SP. However, a third group of variables that concern the manner in which a particular plan functions also influence the plan's

success—such things as: (1) number of years a company has had the plan, (2) the extent to which feedback on performance is given to the employees promptly and in a usable form (Chamberlain, 1946; Burtnett, 1973) and (3) the extent to which too much emphasis is placed on the bonus and not enough on the nonfinancial aspects of the plan (Helfgott, 1962; Moore & Goodman, 1973).

A summary of the studies reviewed is presented in Table 1.

Based on the above identified variables *it was hypothesized that SP success is: positively related to employee participation in decision making, the number of years a company has had the SP, the attitude of management and the chief executive officer (CEO) toward participative management policies, and expectations of success before the plan implemented; and negatively related to company size.* A more detailed description of the specific hypotheses is included in the results section later in the paper.

METHOD

Sample

Data for the variables named above came from 23 companies, all but one of which have, or had, the SP. Not all the data could be collected from all the companies. The number of companies on which data were available for each of the variables ranged from 2 to 23. The number of companies on which specific data analyses were conducted varied from 2 to 21 based on data availability. At the time the study was conducted, 12 of the companies had abandoned the SP (at least in practice if not formally). The average SP duration for these 12 companies was 6 years, although this figure is imprecise because there often is no distinct date of SP abandonment. Of the 10 continued SP companies, the earliest was begun in 1946, and the newest had been implemented less than a year at the time the data were collected.

Although the companies were fairly heterogeneous, they had three notable characteristics in common: (1) all were located in the Midwest, (2) all were engaged primarily in manufacturing, and (3) there was a disproportionately large number of furniture manufacturers. It should be noted that the disproportionate number of furniture manufacturers (8 of 23) is not a sampling bias but rather reflects the type of industry in the area, and the type of area (Midwest) firms that engage in SP activities.

The companies ranged in size from 23 to 3,000 employees with a median of 150.

Procedure

Practical limitations prevented getting measures of all the relevant variables discussed previously. However, the following variables, which correspond to those identified or at least are aspects of them, were used in

the present study (a complete description of each of the variables is available from the author):

1. Scanlon Plan success. This was measured in two ways: (1) whether the SP was subsequently abandoned or retained (22 companies), and (2) a rating of SP success based on three independent judges forced choice paired comparisons of the success of 13 companies' SPs. Raters were asked to contrast organizations on "the extent to which the full effort, experience, creativity, and innovative ability of the entire work force, through the use of the Scanlon Plan, are directed toward increasing the organization's total effectiveness." The interrater reliabilities were .89, .93, and .89. Based on the Spearman-Brown prophecy formula the composite rating had a reliability of .97.

(Attempts were made to obtain "harder" criterion measures. Financial data—cost, cost reduction, profit—were obtained from several of the companies. However, the data tended to be extremely company specific and were not all comparable across companies. It was impossible to identify appropriate non-Scanlon control companies where comparable financial data could be obtained. The financial data were useful for examining *within*-company changes in performance over time, but that is beyond the scope of the present interorganizational comparisons.

A similar attempt was made to get suggestion data. But this information was limited by noncomparability across companies—very different definitions of what constitutes "a suggestion," small sample size, and little overlap between the companies from which the suggestion data were available and companies from which independent variables were available.)

2. Participation in decision making. This variable was measured by averaging responses across all employees to a 5-item scale that has been used in previous research (White & Ruh, 1973), adapted from Vroom (1960). Internal consistency reliability (α) was .81 (9 companies).

3. Expected level of SP success. This measurement was obtained by averaging responses across employees to a 9-Likert-type item scale concerning the extent to which the employees thought the SP would contribute to achieving various desirable outcomes ($\alpha = .91$) (2 companies).

4. Managerial attitudes toward participative management policies. These attitudes were measured by averaging responses from all persons with supervisory responsibilities to a 27 Likert-type item scale developed by Miles to assess attitudes relating to his human resources management style (Miles, 1965) ($\alpha = .94$). A second variable, chief executive officer's attitude, was measured by using only the responses of the most senior executive(s) (18 companies).

5. Reward for following participative management policies. This variable was measured by averaging responses across all managers to six yes/no items regarding the extent to which they thought they would be (1) recognized and (2) not criticized for following participative management policies. The items were taken from the same Miles instrument as the managerial attitude data ($\alpha = .75$) (18 companies).

TABLE
Scanlon Plan

<i>Study</i>	<i>Type</i>	<i>Author Bias</i>
		<i>Case</i>
Chamberlain, 1946	Case study of Adamson Co., a small manufacturer of welded steel tanks	Strong (sensational) pro SP bias— <i>Life</i> magazine
Davenport, 1950	Case study of Lapointe Machine Tool—a 350 employee manufacturer of broaches	Pro SP but realistic
Daigenault, 1952	Another case study of Lapointe Machine Tool	Pro SP bias
Dowd, 1955	Another case study of Lapointe Machine Tool	Pro SP bias
Lesieur, 1951	Another case study of Lapointe	Strong pro SP bias
Lesieur, 1959	Discussion of SP drawing heavily on Lapointe experience	Strong pro SP bias
Northrup & Young, 1968	Summary of problems at Lapointe resulting from SP	Reasonably objective articulation of potential SP problems
Tait, 1952	Description of implementation and early operation of the SP at Stromberg-Carlson Company	Objective (descriptive, not evaluative)
Gilson & Lefcowitz, 1957	Case study of an unsuccessful SP in a small (anon) family owned ceramics plant	Reasonably objective
Martucci, 1957	Case study of SP at Pfaulder Co., five years after plan was implemented	Pro SP bias but more descriptive than evaluative
Steen, Fye, Orth, & Strong, 1961	Description of SP at Revco—a manufacturer of refrigeration units with 495 employees	Mainly descriptive but some pro SP bias
Jehring, 1967	Study of a 200 employee manufacturer (anon) of household fixtures that implemented an SP and then switched to profit sharing	Reasonably objective
Production, 1969	Case study of SP experience at Michigan Wheel—a 230 employee manufacturer of marine propellers	Strong pro SP bias

1

Literature Summary

<i>Correlations/Causes of Success Identified (and corresponding hypotheses in text)</i>	<i>Comments</i>
<i>Studies</i>	
Situation where: profits are determined primarily by productive efficiency; single union—no jurisdictional squabbles; prompt feedback given on performance	This is the company/article that triggered the Scanlon Plan interest and got it all started
Intelligent union leadership; key top executive "who is able to stand the gaff" (H.7, 14) ^b	This is the best known article about the best known SP application—but see Northrup and Young (1968)
Management making and communicating a sincere commitment to employee participation (H.6,13)	Little new information or insights
None	Just another description of Lapointe
"good faith, mutual respect and confidence in hearts of all the participants"	Nothing new, nothing much
None	Apple pie and motherhood—"the satisfaction gained from a job well done will exceed the value of whatever employee bonuses and company profits the plan might generate"
Unwillingness of management to invest in research, capital, and supervision in order to maintain immediate bonus payments	Shows how an SP can get in trouble—in this case because management failed to stand the gaff and succumbed to pressure to maintain bonus payments rather than make needed capital investment
None	Interesting discussion of employee reasonableness when confronted with business realities (company losing money)
Management must have sincere commitment to participation (H.6,7,13,14); underlying company problems (grievances) must be dealt with or they interfere with the SP activities; work force must have at least a minimal level of job/career involvement	Although both union and management concurred in the decision to abandon the SP, some achievement occurred during the period plan in effect: labor costs dropped, bonus was paid, and production process was rationalized
None	See Lesieur and Puckett (1969) below
None	Unquestionably their SP was successful at the time the article was written; however, the company no longer operates with an SP and was one of the abandoned SPs studied by Wallace (1971)
SP (bonus formula) is too rigid in situations where changing product mix results in changes in labor content	Although presented as a switch from an unsuccessful SP to a successful profit sharing program, the situation could be viewed as merely identifying a more appropriate bonus formula (insufficient information to tell)
None	Unlike most articles written shortly after plan implementation, this one was done after 23 years' experience and the plan is still active today

TABLE

<i>Study</i>	<i>Type</i>	<i>Author Bias</i>
<i>Case</i>		
Lesieur & Puckett, 1969	Brief case studies of SPs at Attwood Vacuum Machine, Pfaulder, and Parker Pen	Strong pro SP bias
Gray, 1971	Thorough case study of unsuccessful SP at the large Linwood plant of Pressed Steel Co.—a 6,000 employee producer of car bodies for British auto industry	Objective
Iman, 1972	Thorough case study of entire OD efforts (SP plus others) of a well known (but anon) 400 employee manufacturer of glass components for industrial consumers	Attempts to be completely objective but there may be subtle biases as the author was involved in the company as a change agent
NCPQWL, 1976	Brief case study of SPs at Parker Pen and Dana Corporation	Objective—descriptive only
<i>Books</i>		
Lesieur (Ed.), 1958	Collection of articles on the SP	Clear pro SP bias
Frost, Wakeley, & Ruh, 1974	Summarizes the research, theory, & practice of SP activity centered around Michigan State University	Pro SP bias but good discussion of limitations
Moore & Ross, 1978	A "practical guide" to SP implementation and evaluation, including checklists, questionnaires, and sample forms	Pro SP bias but appropriate emphasis on difficulties
<i>Empirical</i>		
Wallace, 1971 (Ruh, Wallace, & Frost, 1973)	Comparison of managerial attitudes toward participative management policies in 10 continued and 8 abandoned SP companies	Objective (dissertation)
Goodman, Wakeley, & Ruh, 1972	A survey of 2,636 employees from 21 plant sites on how they perceive various aspects of the SP	Objective
Burnett, 1973	A cross lagged panel analysis of relationship between the perceived link between employee suggestions and bonus payments and subsequent employee influence (plus more)	Objective (dissertation)
White, 1974	(some of it summarized in this article)	
NCPQWL, 1975 (Moore & Goodman, 1973)	Three year longitudinal study (including pre-SP measures) of the SP at Chemical Coatings Div. of De Soto, Inc.	Objective

1 cont.

<i>Correlations/Causes of Success Identified (and corresponding hypotheses in text)</i>	<i>Comments</i>
<i>Studies cont.</i>	
None	Pfaulder case indicates sustained SP success twelve years after the Martucci (1957) article was published
SP failure was <i>not</i> caused by management authoritarianism, nor by an unusual work force—basic industrial conflict can overwhelm cooperative interests and prevent SP success	Interesting, thorough, and objective case study written from an economist's rather than a behavioral scientist's viewpoint
There is a wealth of information on correlates of SP success, but it is difficult to summarize and much of it is not SP specific	This study, done as a dissertation, is one of the few studies that objectively combines rigorous data analysis with a willingness to use and interpret qualitative data—well worth reading
None	Nothing new
(specific articles are included elsewhere in this review)	Until recently the only single source of extensive SP information
Too much to summarize	First actual book on the SP—based on over 20 years of actual SP experience
Too much to summarize	Although the authors mention the need to design each plan individually, their cookbook approach does not reinforce this idea. Excellent discussion on bonus formulae
<i>Studies</i>	
Confidence of managers in employees' ability and willingness to participate may be key to SP success (H.6,13)	One of the few empirical studies that explicitly looked at SP success as the dependent variable
None explicit	Provides data showing that although all groups tended to show favorable attitudes toward the plan, attitudes are considerably more favorable for managers than for foremen, and for foremen than for rank and file
Suggests that the availability of accurate and timely information would increase employee participation and SP success	Thorough study but only deals with one narrow aspect of the SP
SP success dependent upon: a simple well communicated bonus formula, development of mechanisms to deal with nonproductive suggestions (gripes) and encourage good suggestions, adequately dealing with the potential role ambiguity of foremen and indirect workers, emphasis on the participative process rather than the structure (H.6,13)	Both of these articles contain a good review of the SP literature and a discussion of SP that goes well beyond the specifics of their research study

TABLE

<i>Study</i>	<i>Type</i>	<i>Author Bias</i>
<i>Empirical</i>		
Greenwood, 1977	Empirical contrast (employee survey) of a successful and an unsuccessful SP company on the Frost et al. (1974) concepts of identity, participation, equity, and managerial competence	Objective (dissertation)
<i>Review/Integrative/</i>		
Strauss & Sayles, 1957	Review of SP with emphasis on potential difficulties	Objective
Shultz, 1958	Discussion of the "environmental diversity" of the 19 companies at the 1957 MIT SP Conference	Pro SP bias
Puckett, 1958	Comparison of the productivity of ten companies in the two years following SP implementation with "base period"	Objective
Helfgott, 1962	A second source review of SP applications with emphasis on the bonus formulae and wage incentive aspects	Reasonably objective (but sometimes naive)
Lesieur & Puckett, 1968	General review of SP literature and activities since the Lesieur (1958) book was published	Strong pro SP bias
Doyle, 1970	Discussion of the SP and implementation of the plan based on his experience as manager of OD at Donnelly Mirrors, Inc.	Strong pro SP bias
Ross & Jones, 1972	Discussion of SP with emphasis on bonus formulae and the critical role of the accountant	Objective
Goodman, 1973	Calls for better theoretical formulations and proposes one based on an expectancy model	Objective (theoretical)
Thierry, 1973	Outline of a field experiment approach with heavy emphasis on SP implementation (in the Netherlands)	Objective

1 cont.

<i>Correlations/Causes of Success Identified (and corresponding hypotheses in text)</i>	<i>Comments</i>
<i>Studies cont.</i>	
None specific	Study may provide foundation for developing instrumentation for diagnosing SP success and/or SP readiness
<i>Theoretical Articles</i>	
SP success is dependent upon: balanced contribution from all segments of the plant; rank and file support for union leadership; good communication between staff, top and middle management; minimizing intergroup rivalry (especially in large organizations); involvement of foremen and rank and file	Strong emphasis on union and union issues (prevalent in much of the early SP literature); generally worth reading
SP is not limited to companies of certain size (H.4,12), economic performance, relative importance of labor cost, job skill, work force characteristics, nonunion status; success is dependent upon realistic positive expectations and competent management (H.6,13)	The data and issues presented are interesting; however, all one knows is that the SP can be applied in diverse situations, not that it is necessarily successful
Productivity gains unrelated to prior financial conditions, size (H.4,12), union status, relative labor costs, type of production process, type of product	Provides strong support for the SP; only issue is the nondiscussion on sample selection
Scanlon Plan success is dependent upon: "assurance that a regular bonus can be paid continually," basic need such as financial difficulty, enthusiastic union and management support (H.6,7,13,14), complete cooperation, special efforts to educate supervisors, segregation of SP and collective bargaining efforts, small size (H.4,12)	One of the few general discussions of the plan—unfortunately the author confuses ingredients necessary for success with actual indices of SP success
The SP can be applied in almost all situations—emphasis on application to large corporations (H.4,12), but little supporting evidence	The authors clearly confuse SP and SP success; wherever an SP is described as unsuccessful they contend that it really isn't an SP; they attempt to refute Northrup and Young's (1968) article on the deleterious effects of the SP at Lapointe
Must not underestimate the process of changing the attitudes and habits of managers who are used to traditional management	Discusses integration of SP with other OD efforts (Managerial Grid, Lickert's ICLS research)
Essential to articulate clearly the bonus formula and reasons for fluctuations	Points out the trade-offs between an accurate but complicated bonus formula and a simpler formula which may not be as fair but is better understood
None	Articulates the lack of, and need for, better theoretical models
Emphasis on preparing an organization prior to SP implementation—need for training and other activities (survey with feedback) to prepare for and hence insure success	Follow through on the planned field experiment not available at time paper was written—the major planned study was curtailed because of intense strikes occurring in many of the trades involved

TABLE

Study	Type	Author Bias	
			Review/Integrative/
Geare, 1976	Discussion of SP with emphasis on bonus formulae	Objective	
Frost, 1978	Discussion of "the diagnosis, assessment, and evaluation which are essential precursors to the success of the SP process"	Pro SP but realistic	
			SP Discussion in
Whyte, 1955	One chapter of book devoted to SP, with heavy emphasis on Lapointe experience	Objective	
McGrégor, 1960	Chapter of classic text devoted to SP	Strong pro SP	
Katz & Kahn, 1966	Several pages of their classic OB text devoted to discussion of SP	Objective	

*This list is by no means exhaustive. Those studies/articles that are (1) very redundant with those reviewed (e.g., more case studies of Lapointe) or (2) not readily available (unpublished reports and M.A. theses) are omitted. References for these additional studies are available from the author.

^bH notations in parentheses refer to hypotheses used in the present study.

6. Number of years a company has had the Scanlon Plan (23 companies).

7. Company size. Total number of employees (23 companies).

Three of the variables that were identified—technology, feedback on performance, and overemphasis on financial aspects—were omitted because appropriate data simply were not available. Similarly, although some worker background data were collected, data were not available from enough companies to investigate properly the relationships between work force characteristics and SP success.

The attitudinal data were collected with six different questionnaires over five years, although most of the data were collected within a three year time period. Coordination of all the data collection was done by one individual, but the group actually involved in the data collection changed over the time period.

The criterion measures were taken after the questionnaire data were collected. The judges who made the forced choice paired comparisons were asked to indicate the SP success that had been achieved at the time corresponding to the time the survey data were collected. One of the raters had little or no familiarity with either the results of the survey data or the current abandoned/retained status of the companies' SP; the other two raters

1 cont.

<i>Correlations/Causes of Success Identified (and corresponding hypotheses in text)</i>	<i>Comments</i>
<i>Theoretical Articles cont.</i>	
SP success requires "intelligent, enlightened, and energetic top management and trade union officials"	Emphasizes the importance of the financial incentives and cautions that money, not participation, is the principal motivation for many employees
Need to carefully delineate and articulate the organization's "mandate"	Interesting discussion of the "ruthless need for competence" and problem ownership although it appears equally applicable to non-SP situations
<i>OB Literature</i>	
Management must: not be preoccupied with protecting its prerogatives, be willing to respond to union initiative, be willing to change, take care to deal with potentially awkward role of foreman	Somewhat dated but interesting reading
None (SP good for everybody)	SP viewed as example of "Theory Y" in practice
SP success <i>may</i> be limited by company size (H.4,12), company's previous financial success, unavailability of a charismatic figure to stimulate support (H.7,14), and increased technology	One of the few places where SP has been integrated into mainstream OB literature

were more familiar with these points. However, the extremely high inter-rater reliabilities reported above indicate that contamination was not a significant problem.

Design

Multi-firm cross sectional and longitudinal designs were used to investigate 14 hypotheses involving relationships (1) between the two SP success criterion variables, (2) among the independent variables, and (3) between the independent variables and the SP success measures.

RESULTS

The first hypothesis deals with the relationship between the two SP success measures.

Hypothesis 1—Rated SP success is higher for companies where the SP is subsequently retained than for companies where the SP is subsequently abandoned. The results supported the hypothesis. Thirteen companies were ranked on SP success (1 = highest SP success). The ranks of the four



companies in which the SP was subsequently abandoned were 9; 10, 12, and 13. The median rank for these four abandoned SP companies was 10/12; the median rank for the nine retained SP companies was 5. The correlation between the ranks and subsequent retention/abandonment of the SP was .71 ($N = 13$, $p < .01$).

The next two hypotheses concern relationships between two measures of SP success and employee participation.

Hypothesis 2—There is a strong positive relationship between mean PDM reported by the employees and rated SP success. The rank order correlation was .79 ($N = 7$ companies, $p < .05$). The result provided strong support for the hypothesized relationship between PDM and SP success.

Hypothesis 3—Mean PDM is higher among employees where the SP is subsequently retained than among employees in companies where the SP is subsequently abandoned. The means for PDM of 3.28 and 3.03 for the retained and abandoned companies ($N = 5$ and 2, respectively) differed in the predicted direction, although the difference was not statistically significant ($t = 1.96$, n.s.). In only one case was the mean PDM for a continued SP company lower than the higher of the mean PDM scores for the two abandoned SP companies. The point biserial correlation between mean PDM and retention/abandonment was .66 ($N = 7$, n.s.).

Hypotheses 4 to 10—Hypotheses 4-7 involve relationships between the rated SP success criterion and the four independent variables: size, time, managerial attitudes, and CEO attitudes. Specifically, it was hypothesized that rated SP success would be negatively related to company size (H-4), positively related to the number of years a company has had the SP (H-5), and positively related to average managerial attitudes (H-6) and the CEO's attitudes (H-7). Hypotheses 8-10 involved relationships among the independent variables. It was hypothesized that there would be a negative relationship between company size and average managerial attitudes (H-8—as follows from H-4 and H-6) and a positive relationship between perceived rewards for following participative policies and both average managerial attitudes (H-9) and the CEO's attitudes (H-10). The hypothesized relationships and results are presented in Table 2. Most of the findings supported the hypotheses, although some of the relationships were confounded by high intercorrelations among some of the independent variables. There were some noticeable exceptions. Contrary to hypotheses 4 and 8, size correlated positively with rated SP success and managerial attitudes. Also surprising was the strong positive relationship between size and time. There is no logical reason why the number of employees in an organization should correlate highly with the number of years the organization has had an SP, and it appears that this relationship may be reflecting a peculiarity of the sample rather than a meaningful relationship. It was felt that this relationship between size and time might be the cause of the positive correlations of size with rated SP success and managerial attitudes. To investigate this possibility, a series of semipartial

TABLE 2
Hypothesized Relationships and Obtained Correlations for the
Independent Variables and Rated Scanlon Plan Success

<i>Item</i>	<i>Size</i>	<i>Time</i>	<i>MA^a</i>	<i>R^a</i>	<i>CEO-MA</i>
TIME	— rho = .56* N = 13				
MA	low neg rho = .51 N = 10 (H-8)	— r = .83** N = 10			
R	— rho = .38 N = 10	— r = .59* N = 10	very high pos r = .70* N = 10 (H-9)		
CEO-MA	— rho = .51 N = 10	— r = .56* N = 10	— r = .66* N = 10	very high pos r = .16 N = 10 (H-10)	
RSPS	low neg rho = .43 N = 13 (H-4)	moderate pos rho = .77** N = 13 (H-5)	high pos rho = .78** N = 10 (H-6)	— rho = .51 N = 10	high pos rho = .48 N = 10 (H-7)

KEY: —Hypothesized relationship
—Obtained relationship
—Sample size
—Hypothesis # as used in text

*Because these variables are averages, they yield more reliable scores and hence higher correlations than can be expected from individual data.

* $p < .05$

** $p < .01$

Size—number of employees in a company.

Time—number of years a company has maintained an SP.

MA—average managerial attitude toward participative management policies.

R—average extent to which managers believe they would be rewarded for following participative management policies.

CEO-MA—the chief executive officer's attitude toward participative management policies.

RSPS—rated SP success based on independent ratings by three judges.

correlations was computed. With time partialled out of size (but not out of managerial attitudes) the correlation between size and managerial attitudes dropped from .51 to .05. Therefore, it appears that the surprisingly high correlation between size and time explains the positive correlations of size with managerial attitudes and SP success. Going the other way, with the effect of size partialled out of time (but not out of SP success), the correlation between time and SP success dropped from .75 to only .61. However, although the correlations involving size did drop to zero, they were not negative as hypothesized, and the net result seems to be that both managerial attitude and SP success are independent of company size.

As predicted (H-5), time was positively related to SP success, and as noted above, this relationship was not just an artifact of the correlation between size and time. But time was highly correlated with the other

independent variables (managerial attitudes, CEO attitude, and reward for following participative policies). Unlike the correlation between size and time, these correlations likely represent meaningful relationships rather than sample peculiarities. It seems plausible that one of the ways time influences SP success is through its effect on managerial attitudes, which in turn may be influenced by the extent to which managers are rewarded. For this reason it did not seem appropriate to compute partial correlations among these variables.

As predicted (H-6), managerial attitudes were positively and strongly related to SP success, and the relationship closely paralleled that of time. As predicted (H-7), CEO attitudes were positively correlated with SP success, but the relationship was not as strong as was expected. It is likely that the relationship was limited by the unreliability of the CEO attitude measure which, unlike the managerial attitude variable based on the average of all the managers in an organization, was based on the questionnaire responses of only one (or in two cases, two) managers.

As predicted (H-9), managerial attitudes were strongly correlated with the extent to which managers believed they would be rewarded for following participative management policies.

Contrary to prediction (H-10), the extent to which managers believed they would be rewarded for following participative management policies was only slightly correlated with CEO attitudes. However, because of the likely unreliability of the CEO measure, the obtained result did not provide an adequate test of the general hypothesis concerning the critical role of the chief executive officer.

Hypothesis 11—Mean expected level of SP success, measured prior to implementing the SP, is higher in a company where the SP subsequently succeeds than in a company where the SP subsequently fails. Data were available from only one company for each of the conditions. Mean expected success for the subsequently successful SP company was 3.77 and for the subsequently abandoned SP company, 3.65. The difference between the two groups of individuals, considering sampling from finite populations, was statistically significant but small and of limited practical significance ($Ns = 108$ and 52 , $p < .05$). Furthermore, because the appropriate unit of analysis for this hypothesis is the company, with zero degrees of freedom, it is impossible to estimate the significance of the finding at the company level.

The remaining three hypotheses involve essentially the same relationships as do previous hypotheses, but use a different criterion measure.

Hypothesis 12—The average size (number of employees) is lower in companies where the SP has been retained than in companies where the SP has been abandoned—the same relationship as H-4 but a different criterion measure of SP success. Data from 9 continued and 12 abandoned SP companies were used to test the hypothesis. The mean number of employees for the abandoned SP companies was 403 as opposed to 232 for the retained SP companies. The point biserial correlation was $-.17$ ($n = 21$,

n.s.). But these figures are deceptive because the abandoned SP company mean was inflated by one very large company (3,000 employees). With this company eliminated, the mean dropped from 403 to 166, and the correlation changed from $-.17$ to $.13$. The range for the 12 abandoned SP companies was 48 to 3,000 with a median of 105/147; for the 9 retained SP companies the range was 23 to 600 with a median of 160. The finding did not support the hypothesis but did parallel the finding for H-4 (after the effects of time had been partialled out). That is, for this sample of companies SP success appears to be independent of company size.

Hypothesis 13—Managers in organizations where the SP is subsequently retained have more favorable attitudes toward participative management policies than do managers in organizations where the SP is subsequently abandoned. This is essentially the same relationship as H-6 but uses a different criterion measure and a longitudinal design. Data were available from three companies in which the SP was subsequently abandoned, and 7 companies in which the SP was subsequently retained. For the three subsequently abandoned SP companies, mean managerial attitudes ranged from 3.74 to 4.18 with a mean of 3.90; for the seven subsequently retained SP companies they ranged from 4.00 to 4.76 with a mean of 4.32. The point biserial correlation was $.65$ ($N = 10$, $p < .05$). The finding parallels that of H-6 except with a longitudinal rather than a cross-sectional design. The managerial attitude measure did predict subsequent retention/abandonment of the SP. None of the subsequently abandoned SP companies exceeded the mean of the subsequently retained SP companies. Conversely, none of the retained companies was lower than the mean of the abandoned companies.

Hypothesis 14—The CEO's attitude toward participative management policies is significantly lower in companies where the SP has been abandoned than in companies where the SP has been retained—similar to H-7 and related to H-13. Data from the same 10 companies used in the previous hypothesis were used to test this hypothesis. In 8 of the 10 cases the data were from a single executive at or near the top level of the organization. In the two other cases scores were based on the average responses of two executives at equally high levels in the organization. For the three abandoned SP companies CEO attitude ranged from 3.04 to 5.00 with a mean of 4.33; for the seven subsequently retained SP companies it ranged from 3.22 to 5.00 with a mean of 4.49. The point biserial correlation was $.13$ ($N = 10$, n.s.). Although the relationship was in the predicted direction, it was small and insignificant and is suspect because of the nature of the CEO attitude measure.

In summary, three hypotheses examined interrelationships among the different measures of SP success (rated success, subsequent retention/abandonment of the SP) and employee participation. A strong relationship was found among all these measures.

To examine potential causes of success at the intercompany level, two criterion measures were used—rated SP success and subsequent retention/

abandonment of the SP. However, regardless of which criterion was used, the findings were very comparable. Number of years with the SP, managerial attitudes, and CEO attitudes all were positively related to SP success. Company size was unrelated to subsequent retention/abandonment of the SP and was unrelated to rated success when the effects of time were partialled out of the company size. Because of measurement problems no conclusion could be reached regarding the possible effects of the CEO's attitude toward participative management policies. It is encouraging to note that the characteristic over which no control can be exerted (company size) was not as strongly related to success as were other variables (managerial attitudes, time) that can be dealt with.

DISCUSSION

As indicated previously, research in which the entire organization is the unit of analysis poses problems that are not usually encountered in behavioral science research. These limitations are clearly apparent in the present study: small *Ns* (aggravated by substantial "missing data"), unrepresentative sample, and lack of experimenter control. This is further exacerbated by the fact there is no such thing as *the* Scanlon Plan—it is not a "treatment condition" but rather an organizational change process that is unique in each of its applications. All these factors serve to limit severely the implications of the study. But there is no escaping the need for this type of research if some of the key questions about the determinants of organizational effectiveness are to be answered. It is unrealistic to expect the same standards as when the unit of analysis is the individual or small group and the phenomena are much more subject to investigator control. Thus, no amount of this kind of research will enable one to specify precisely the circumstances in which the SP (or any other OD activity, for that matter) will or will not succeed. Given these limitations, some conclusions/implications can be drawn:

1. Although it may be rather obvious, it was shown by the study that employee participation, at least as perceived by the employees, is highly related to SP success. Therefore, high success of the SP is unlikely unless a high amount of employee participation can be achieved.

2. Within the range of size represented by the companies in the present sample, company size does not seem to be a major factor in determining success. It appears that, with up to 600 employees (the actual figure may be higher), the SP can be implemented without size imposing a limiting factor on the amount of success that can be achieved.

3. Managerial attitudes are strongly related to SP success and they predict, although not perfectly, whether an SP will subsequently succeed or fail.

4. Success of the SP is highly related to the number of years a company has had an SP. Therefore, patience seems to be in order for achieving high

levels of success. Expectations of instant changes likely will be met with disappointment.

5. Although the evidence is weak, it appears that expectations may play a part in subsequent success. If this is the case, depending on the causes of these expectations, the implication would be that (1) when the plan is first considered care should be taken that the employees develop favorable (but realistic) expectations or (2) persons/organizations with initially high expectations should be selected.

6. Although this study did not provide adequate data, prior studies have provided fairly strong evidence that a high level executive must take a leading role if the SP is to succeed. The situation is similar for background characteristics of the work force.

7. Although not formally a part of this study, technology does not seem to be related to success. The variable was not included because an appropriate manner in which to measure it was not available. But a cursory comparison of the companies on the extremes of the rated SP success criterion, and on the abandoned/retained criterion, provided no notable differences in technology. Therefore, at least within the range of technologies represented by the present sample, technology does not seem to be a limiting factor in connection with the success of the Scanlon Plan.

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A Contextual Model of Employee Turnover Intentions

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An integrative and expanded contextual model for investigating employee intentions to stay or leave an organization is proposed. Four structural/process variables (upward mobility, distributive justice, communication and routinization), one environmental variable (opportunity), one mediating variable (job satisfaction), and four demographic variables (occupation, age, education, and sex) are significant.

A concentration on determining the causes of employee intentions to stay or leave has been one of the recent research approaches in the organizational turnover literature. One group of researchers has focused on determining the causes of employee's intention to stay (Alley & Gould, 1975; Atchison & Lefferts, 1972; Kraut, 1975; LaRocco, Pugh, & Gunderson, 1977; Mitchell & Albright, 1972; Parker & Dyer, 1977; Sims & McKemey, 1977; Shenk & Wilbourn, 1971; Tainio, 1977; Waters, Roach, & Waters, 1976). Most of these studies examine which variables significantly cause military personnel to remain in their respective military careers.

Another group of researchers has focused on determining the causes of employees' intention to leave (Lyons, 1968; Mercer & Mould, 1977; Mangione, 1973; NORC, 1972; Nicholson, Wall, & Lischeron, 1977; Price & Bluedorn, 1977). These studies have examined American Catholic priests, English and American nurses, steel workers, and other industrial workers.

A problem with most of these studies is that they merely focus on the two panels of demographic variables and job satisfaction as predictors of an employee's intention. They simply identify the salient demographic aspects of employees and their attitudes about job satisfaction that interact to cause their intentions. Very few of these studies incorporate all of the following: a set of logical assumptions about the motivational process of intent decisions, a direction of causality, a framework for detecting and ranking of significant variables, and application to the industrial world.

Many of the researchers in both approaches have argued for these additional research emphases. LaRocco et al. (1977), Mangione (1973), Nicholson et al. (1977), Price and Bluedorn (1977), and Tainio (1977) call for the investigation of additional variables such as environmental conditions, perceived level of involvement in decision making, community participation and occupational standing that directly tap the dynamics of the individual within the organization and their interface with their respective environments. Porter and Steers (1973) have emphasized breaking down the global concept of job satisfaction into organizational, work, and personal factors. Parker and Dyer (1977), Mitchell and Albright (1972), Nicholson et al. (1977), Price and Bluedorn (1977), Sims and McKemey (1977), and Tainio (1977) have considered the motivational mechanisms of employee intentions in terms of expectancy theory or March and Simon's (1958) net satisfactions from contributions and inducements.

The purpose of this study is to provide an integration of the literature concerning intent to stay or leave and then to investigate a comprehensive model of intent to leave. The concepts used to develop the model are intended to capture the three additional research emphases and make application of this model to the industrial world.

MODELING FRAMEWORK

The model is displayed in Figure 1. Anatomizing the model reveals how the additional research emphases have been incorporated. The model contains ten determinants, two intervening variables, six correlates and intent to leave. A brief definition and an example of each of the ten determinants and the two intervening variables will give emphasis to the social-psychological motivational process.

Pay indicates the money given to employees in return for their services.

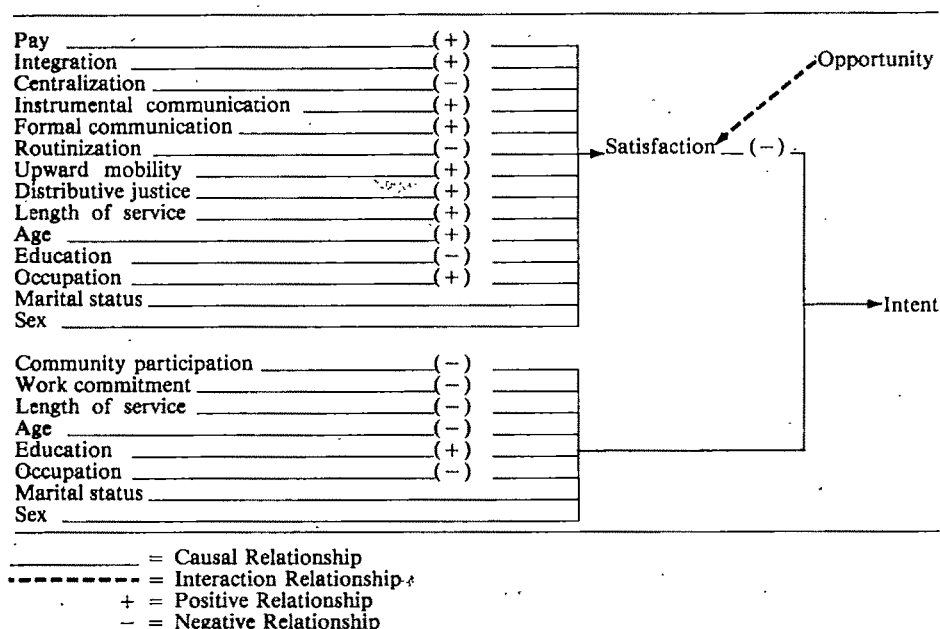
Integration is the extent of participation in primary and/or quasi-primary organizational relationships as indicated by having close friends at work.

Instrumental communication is the extent to which information about role performance is transmitted to the organizational members as signified by on-the-job training. Furthermore, this transmission of actual work results corresponds to the micro job design concept of feedback (Hackman & Oldham, 1975; Pierce & Dunham, 1977; Sims, Szilagyi, & Keller, 1976).

Formal communication is the extent to which information is officially transmitted to the organizational members as conveyed in memorandums and company training manuals.

Centralization is the extent to which power is concentrated in an organization as often reflected in "participation in decision-making." Pierce and Dunham (1977) indicate that centralization reflects, in part, the micro job design concept of task autonomy (Hackman & Oldham, 1975; Sims et al., 1976).

FIGURE 1
The Causal Model of Intent to Leave



Routinization is the extent to which job related performance is repetitive. Again, there is a close kinship to a micro job design concept—skill variety (Hackman & Oldham, 1975; Pierce & Dunham, 1977; Sims et al., 1976). Managerial and professional occupations typically have a lower degree of routinization than do clerical occupations.

Distributive justice is the extent to which conformity to the norms of the organization is followed by the distribution of positive sanctions from the organization. A strong relationship between promotion and merit reflects a high degree of distributive justice.

Upward mobility is the movement between different status levels in an organization as reflected in advancement and promotion of personnel.

There are two variables that intervene between these eight determinants and intent to leave. These two variables primarily indicate the motivational process of an employee's intention to leave.

Job satisfaction, the first intervening variable, is the extent to which organizational members have a positive affective orientation toward membership in the system. Members who have a positive affective orientation and a negative affective orientation are, respectively, satisfied and dissatisfied.

It is assumed that the eight determinants affect the motivational process by producing an indirect impact on intent by acting first on job satisfaction. Therefore, low pay, few close friends, little formal and job related information, high centralization, routine work, low distributive justice,

and little promotional opportunity produce a decrease in job satisfaction which, in turn, produces an increase in intent to leave.

Following March and Simon (1958), it is assumed that the members will act to maximize their *net balance* of satisfactions over dissatisfactions. If the net expectations of the member result in net dissatisfaction, the member likely would be expected to leave. However, the member's action choice to leave may be mediated by the second intervening variable—opportunity.

Opportunity is the extent to which alternative occupational roles are available in the environment as suggested by employment opportunities. If unemployment is high, generally opportunity is low.

Opportunity is not affected by job satisfaction or any of the ten determinants. However, it does influence the relationship between satisfaction and intent to leave. For example, if some members of an organization are dissatisfied and if there are other job opportunities, then those members are likely to leave. The interaction effect between job satisfaction and opportunity will be investigated.

The last two determinants are posited to have a direct motivational impact on intent to leave rather than indirect motivation through job satisfaction.

Community participation is the extent of involvement in the social life of a community. Voluntary membership in community organizations, such as churches, constitutes this involvement.

Work commitment is the extent to which the occupational role constitutes the central life interest of organizational members. Implicitly, the highly work-committed members have strong beliefs and acceptance in their work goals and values, will exert considerable effort on behalf of their work, and have a strong desire to maintain membership in an organization that satisfies their work objectives. This variable exhibits characteristics similar to those of the recently investigated concept of "organizational commitment" (Porter, Crampon, & Smith, 1976; Steers, 1977; Marsh & Mannari, 1977). The wife who prefers to work rather than raise a family represents high work commitment.

Intent to leave, the dependent variable, is indicative of the employee's degree of intention to leave the organization.

The remaining six demographic variables—length of service, age, education, occupation, marital status, and sex—are self-explanatory. It is asserted that these variables will have motivational consequences for job satisfaction as well as intent. Consequently they will be investigated in all parts of the model.

The causal direction emphasis is indicated by the relationships in Figure 1 and by the set of propositional statements presented in Table 1.

The framework for detecting and ranking significant variables is indicated by the use of path analysis. Path analysis can provide for a test of the causal model and for ranking the statistical significant variables in terms of their total causal effects on intent.

TABLE 1
Statement of Propositions

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- A. Determinants and intervening variables**
- I. *Pay*: Successively higher amounts of pay will produce successively lower amounts of intent to leave.
 - II. *Integration*: Successively higher amounts of integration will produce successively lower amounts of intent to leave.
 - III. *Instrumental communication*: Successively higher amounts of instrumental communication will produce successively lower amounts of intent to leave.
 - IV. *Formal communication*: Successively higher amounts of formal communication will produce successively lower amounts of intent to leave.
 - V. *Centralization*: Successively higher amounts of centralization will produce successively higher amounts of intent to leave.
 - VI. *Routinization*: Successively higher amounts of routinization will produce successively higher amounts of intent to leave.
 - VII. *Distributive justice*: Successively higher amounts of distributive justice will produce successively lower amounts of intent to leave.
 - VIII. *Upward mobility*: Successively higher amounts of upward mobility will produce successively lower amounts of intent to leave.
 - IX. *Job satisfaction*: Successively higher amounts of job satisfaction will produce successively lower amounts of intent to leave.
 - X. *Opportunity*: Successively higher amounts of opportunity will produce successively higher amounts of intent to leave.
- B. Correlates**
- I. *Length of service*: Members with low lengths of service usually have higher rates of intent to leave than members with high length of service.
 - II. *Age*: Younger members usually have higher rates of intent to leave than older members.
 - III. *Education*: Better educated members usually have higher rates of intent to leave than do less educated members.
 - IV. *Occupation*: Members with lower occupational status usually have higher rates of intent to leave than do members with higher occupational status.
 - V. *Sex and marital status*: The data are inconclusive and thus no relationships are posited.
-

Finally, the applied viewpoint is implicit in the contextual nature of the model. Included in the model are major environmental and organizational variables that affect the decision maker and over which the management of most organizations has control. Knowledge of the contextual variables that influence the employee's intention to leave decision could induce management to reexamine and alter these contextual variables and thus possibly help reduce actual turnover.

In summary, the model to be investigated posits causal relationships between contextual variables that motivate an employee's intent to leave decision and that, subsequently, may be controlled by management.

METHOD

Site, Subjects, and Procedure

Data were collected from 250 full-time members of a medium size, service-oriented business organization (employs 500 members) in a small midwestern community (50,000 people). This organization is responsible for marketing an assortment of educational programs and services. The research focused on only the full-time members of the organization. They receive a company fringe-benefit package and a monthly salary. The part-time members do not.

Data were collected by a questionnaire distributed to 250 full-time members at the work place; 200 forms were returned by mail directly to the researcher, an 80 percent response rate. Because of missing data, only 177 out of the 200 returned questionnaires were used in the data analysis.

The occupational breakdown of the sample is as follows: (1) administrative ($n = 15$), consisting of such positions as the president, vice presidents, and regional directors; (2) professionals ($n = 53$), including statisticians, psychologists, and computer analysts; (3) supervisors ($n = 10$), including program and project managers; (4) service ($n = 7$), including the food preparation and building maintenance personnel; (5) technical ($n = 9$), including the art technicians and printing press operators; and (6) clerical ($n = 83$).

Measures

All the measures except job satisfaction were adapted from the questionnaire used by Price and Bluedorn (1977). All of the variables except the correlates and work commitment utilized a 5-point Likert scale response format.

The intent to leave measure consisted of simply asking members, in two questions, about the degree of their intentions to leave or stay with the organization within the next year and then combining their responses into an index. This procedure was based on similar measures used by the National Opinion Research Center (1972) and Lyons (1968).

Ten of the independent variables were measured by multiple items and then combined into indices. The item composition for each index was determined by a factor analysis using an orthogonal rotation, *R* factoring, and classical solution. These variable indexes are: integration, instrumental communication, formal communication, centralization, routinization, distributive justice, upward mobility, community participation, job satisfaction, and opportunity. Except for job satisfaction, validity of the remaining nine variables is assessed in Price and Bluedorn (1977).

The job satisfaction measure incorporates 8 out of the 18 questionnaire items developed by Brayfield and Rothe (1951). The 18 items and the instrument's validity are reported in Price (1972).

The two remaining independent variables, pay and work commitment, and the six correlates—length of service, age, occupational level, education, marital status, and sex—were each measured by a single item.

As a measure of internal consistency, the coefficient alpha was used to determine the reliability of the indices. These reliabilities (in parentheses below) are generally acceptable for exploratory research (Nunnally, 1967):

Integration (.83)	Upward mobility (.90)
Instrumental communication (.87)	Community participation (.88)
Formal communication (.76)	Job satisfaction (.88)
Centralization (.86)	Opportunity (.68)
Routinization (.83)	Intent to leave (.90)
Distributive justice (.77)	

The data were analyzed by the use of a step-wise multiple regression algorithm from the *Statistical Package for the Social Sciences* (SPSS) (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975). This technique indicates the extent to which the set of determinants and correlates produce variations in intent. The test for the causal linear relationships in the model utilizes path analysis, a derivative of multiple regression analysis. The statistical significance of the determinants and path coefficients is based on *F*-test results being less than or equal to the .05 level of significance.

RESULTS

The first results consider the linearity assumptions of the data. Using an SPSS subprogram breakdown procedure (Nie et al., 1975) which includes a test for linearity, the data were found not to deviate from linearity at the .05 level of significance.

The second results consider the issue of multicollinearity. Although it is clear what multicollinearity can do to regression coefficients, it is unclear as to what constitutes high multicollinearity. Kohout and Kim (Nie et al., 1975) suggest that extreme collinearity occurs when intercorrelations are above .80. The correlation between pay and occupation is .82. The correlation between pay and education is .67, and the correlation between occupation and education is .59. It therefore would seem feasible to combine occupation and education into a social class index. However, the correlation of .87 between social class and pay made the multicollinearity issue worse. It was therefore decided to continue using occupation and education in the analysis.

The third result considers the proposed interaction between satisfaction and opportunity. The result indicates statistical nonsignificance when tested with an "increment in R^2 test" (Kerlinger & Pedhazur, 1973). Consequently, it is dropped from the remainder of the analysis.

The remaining three results consider the path analytic results deduced from multiple regression analysis of the data. First, job satisfaction is regressed with nine of the determinants and all of the correlates. Table 2 indicates the following seven statistically significant variables and their respective standardized partial regression coefficients: routinization (-.36), instrumental communication (.15), distributive justice (.19), opportunity (-.12), age (.23), sex (-.19), and occupation (-.23).

The results for the four determinants are consistent with the propositions of the model. Job satisfaction decreases with an increase in routinization and opportunity, but it increases with more instrumental communication and distributive justice. The results for the three correlates support the age and sex propositions but not the occupation proposition. They are interpreted as: Job satisfaction increases with age, women are more job satisfied than men, and the higher occupational members have less job satisfaction than lower occupational members.

TABLE 2
Satisfaction Explained by Determinants and Correlates

<i>Variables</i>	<i>Zero-order Correlation</i>	<i>Standardized Partial Regression Coefficient</i>
Pay	.21	.12
Integration	.07	.08
Routinization	-.46	-.36**
Centralization	-.34	-.12
Instrumental communication	.36	.15*
Formal communication	.24	.08
Distributive justice	.42	.19*
Upward mobility	.32	.12
Opportunity	-.10	-.12*
Community participation	.18	.03
Work commitment	.02	.02
Age	.30	.23**
Length of service	.08	-.14
Sex	-.15	-.19*
Marital status	-.21	-.11
Occupation	.17	-.23*
Education	.10	.08
$R^2 = .52$ (adj $R^2 = .48$) $n = 176$; $F = 11.61^{**}$; $df (15,160)$		

* $p \leq .05$

** $p \leq .001$

TABLE 3
Intent to Leave Explained by Determinants and Correlates

<i>Variables</i>	<i>Zero-order Correlation</i>	<i>Standardized Partial Regression Coefficient</i>
Pay	-.07	-.23
Integration	-.06	.03
Routinization	.19	-.06
Centralization	.18	.03
Instrumental communication	-.28	-.05
Formal communication	-.27	-.06
Distributive justice	-.32	-.05
Upward mobility	-.36	-.22*
Satisfaction	-.55	-.37**
Opportunity	.12	.11
Community participation	-.12	-.01
Work commitment	.03	-.08
Age	-.30	-.25*
Length of service	-.04	.12
Sex	.18	.05
Marital status	.09	-.05
Occupation	-.02	.11
Education	.12	.27*
$R^2 = .46$ (adj $R^2 = .40$) $n = 176$; $F = 7.45^{**}$; $df (18,157)$		

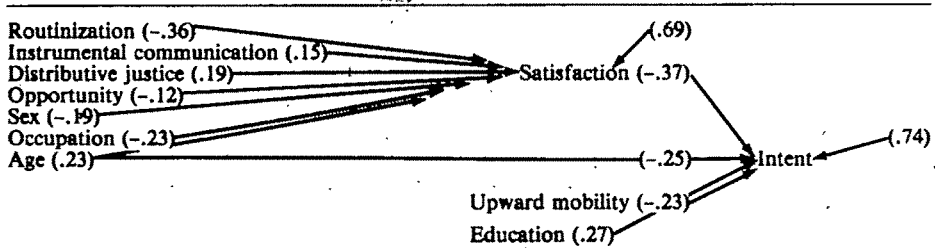
* $p \leq .05$

** $p \leq .001$

Intent to leave is regressed with all of the determinants and correlates. Table 3 indicates the following four statistically significant variables and their respective standardized partial regression coefficients: job satisfaction (-.37), upward mobility (-.22), education (.27), and age (-.25). The

direction of all these variables is as posited. As job satisfaction, upward mobility, and age increase, intent to leave decreases. As education increases, intent to leave increases. The resultant path diagram is presented in Figure 2.

FIGURE 2
Path Diagram



Finally, the 10 ranked explanatory variables and their respective total causal effect coefficients as presented in Table 4 are as follows: job satisfaction (-.37), occupation (.36), age (-.34), education (.27), upward mobility (-.23), opportunity (.15), distributive justice (-.12), sex (.11), instrumental communication (-.10), and routinization (.07).

TABLE 4
Total Causal Effects of Statistical Significant
Variables with Intent to Leave

Variable	Causal Effects		Total
	Direct	Indirect	
Job satisfaction	-.37	—	-.37
Occupation	.27	.09	.36
Age	-.25	-.09	-.34
Education	.27	—	.27
Upward mobility	-.23	—	-.23
Opportunity	.11	.04	.15
Distributive justice	-.05	-.07	-.12
Sex	.04	.07	.11
Instrumental communication	-.05	-.05	-.10
Routinization	-.06	.13	.07

DISCUSSION

The purpose of this study was to investigate a comprehensive model of employee intention to stay or leave an organization. Construction of the model focused on two themes—(1) integrated causal proposition formulation and testing and contextual inclusion and (2) applied implications.

The propositions were formulated from a majority consensus of the current literature on turnover intention behavior. Because there is no published turnover intention literature that utilizes path analysis to test

this integrated developmental model, the discussion will focus on the causal direction and placement of the three statistical, nonsupported propositions. Obviously, external validity for these digressions from the majority of literature and generalizability will have to come from further investigation of the model in other industries and organizations. At this point, one deviant case should not necessitate an abrupt change in the propositions that have wide support.

From the 10 statistically significant propositions, only the occupation proposition did not follow the posited causal direction. It was posited that members with lower occupational status would have higher intent to leave than would those with higher occupational status (Mangione, 1973; Price, 1977). However, the reverse occurred. A post hoc explanation of this finding is purely speculative, especially when occupation is highly collinear with pay. It simply may be that men who hold the majority of the high status administrative and professional jobs (43 out of 72) desire more pay and, consequently, intend to leave if higher paying jobs are found.

Upward mobility and opportunity are the only two variables that do not follow the causal placement indicated in the propositions. The direct impact of upward mobility on intent to leave, rather than its proposed indirect impact through job satisfaction (Mitchell & Albright, 1972; Parker & Dyer, 1977; Porter & Steers, 1973; Price & Bluedorn, 1977; Price, 1977), suggests that members place a high value on promotional and advancement opportunities. The sample consisted of 66 percent women and, as previously mentioned, men held 43 of the 72 high status jobs. A conjectural implication for management is that this organization's female work force is aware of their equal rights, especially as the organization is located in a liberal university town, and that management could reduce potential hostilities and turnover by promoting and advancing more women.

Opportunity produced a direct effect on job satisfaction rather than the posited interactive effect with job satisfaction (March & Simon, 1958; Price & Bluedorn, 1977; Price, 1977). It may be that members experience relative depreciation (Merton & Kitt, 1950) after observing better jobs in their environment that are available to them. Consequently, this would directly lower their present job satisfaction. Additional support for this causal placement of opportunity has come from Bluedorn (1976). The broader implication of this researchable hypothesis is the prediction of labor force satisfaction as a function of the business cycle.

The contextual nature of the model employs concepts expressed by Kraut (1975), Waters et al. (1976), and Hambrick and Snow (1977). The contextual nature suggests that environmental, structural/process, and personal demographic variables (correlates) have a causal impact on the decision maker. The correlates have been posited to be separate and distinct in terms of predictability from the other variables. This distinction is verified by the correlation matrix, and the regression results indicate that an additional 8 percent of variance is explained by the correlates.

The data indicate that the employee is motivated to evaluate satisfactorily four structural/process variables (routinization, instrumental communication, distributive justice, and upward mobility) and one environmental variable (opportunity) in light of their personal occupational, educational, age, length of service, and sexual characteristics within the organization. Clearly, management has organizational control over the four structural/process variables and to a lesser degree, legally, over many of the personal variables. Management controls the number of people employed in the organization and can affect the environmental employment opportunity variable. Thus, management can work with the employees to alleviate contextual dimensions that are motivating intent to leave decisions.

Although the predictive power of the model is not unusually high (.40), it does compare favorably with other intentions research—.36 (Alley & Gould, 1975), .47 (Parker & Dyer, 1977), and .52 (Price & Bluedorn, 1977). The development of this integrated, contextual model is an effort to move the organizational turnover research on intentions behavior toward a middle-range theory development called for by Weick (1974). In this effort, Lewin's formula for behavior has been followed:

Behavior and development depend upon the state of the person and his environment. $B = f(P, E)$ have to be viewed as variables which are mutually dependent upon each other. In other words, to understand or to predict behavior, the person and his environment have to be considered as one constellation of interdependent factors (1955, pp. 239, 240).

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The Instrumental Value of Interorganizational Relations: Antecedents and Consequences of Linkage Formation¹

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This study examines factors that enhance an agency's efforts to establish interorganizational linkages that are instrumental to the achievement of its goals. Among the findings is that high value linkages are facilitated by a smaller agency budget and the need to provide a wide range of services. Other factors contributing to a lesser extent are the presence of an appropriate decision making mechanism within the agency and the ability to establish relations freely and to maintain those relations with other organizations.

The fundamental purpose of this study is to increase understanding of the interorganizational linkage formation process. The prevailing perspective is that interorganizational relations are instituted because they are perceived by the focal organization as being instrumental for controlling its environment. However, a review of the literature indicates that very little research has attempted to test this basic assumption. Indeed, as noted in Whetten and Aldrich (1979), past research generally has not been concerned with identifying the conditions under which it is appropriate to follow the prevailing theories' assumptions regarding the process of establishing interorganizational relations. Specifically, it is of concern that the resource control model appears to be based on highly restrictive assumptions regarding the autonomy of, and decision making criteria used by, administrators in forming linkages. Consequently, it is important to investigate the organizational and environmental conditions under which

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this framework is likely to model accurately the linkage formation process. To do this, this study tests hypotheses about conditions that enable public agencies to establish linkages with various groups of community organizations primarily on the basis of their perceived utility in aiding the focal organization to fulfill its mission. In addition, this study investigates whether interorganizational linkages, regardless of the original purpose of their establishment, appear to generate a perception that the organization is able to control its environment. In this manner the paper examines the factors that affect whether interorganizational relations are established primarily for their instrumental value and also whether linkages once established are perceived as useful in controlling the environment.

BACKGROUND

The literature on interorganizational relations suggests that an organization establishes linkages because of their perceived instrumental value for enhancing organizational performance. Current theories in this area posit that the principal value of interorganizational linkages is increased control over environmental contingencies, the most notable of which is the availability of resources. Thompson (1967) proposed that under norms of rationality, organizations will attempt to reduce their dependence on resources controlled by other organizations by negotiating a long-term contract; co-opting the controlling organization; establishing a joint venture with the controlling organization involving an exchange of resources between both parties; or by forming an agreement at better terms with a third party. These strategies are consistent with March and Simon's (1958) proposition that by arranging negotiated environments organizations avoid having to anticipate environmental action.

This paradigm is clearly visible in the work that has been done on interagency coordination. As outlined by Turk, "The need for interorganizational relations is probably related to awareness of organizations of interdependence with other organizations and results in attempts at coordination" (1972, p. 40). The role of organizational interdependence as a stimulus for coordination has been noted repeatedly in the literature (Hage & Aiken, 1967; Litwak & Rothman, 1970; Lehman, 1975; Reid, 1969; Pfeffer & Nowak, 1976; and Whetten, 1977). Although there is some disagreement regarding the direction of causation between interdependence and the establishment of joint programs (Pfeffer & Nowak, 1976, p. 400), it is clear that coordination is viewed as an environment controlling strategy. This joint effort to control the environment of the participating organizations is accomplished by increasing the predictability of resource flow, maintaining a clear domain of high social importance, and extending the application and defense of the agency's shared paradigm (Benson, 1975).

The implications of the environment control paradigm for the study of organizational administration probably are best exemplified in the work

of Yuchtman and Seashore (1967). They proposed that resource control should serve as the principal criterion for measuring organizational effectiveness, inasmuch as an organization's performance is ultimately a function of its ability to gain control over environmental constraints. This line of reasoning suggests that administrators would establish interorganizational linkages primarily for the purpose of obtaining resources (means) necessary to fulfill the organization's mission. Although it is likely that administrators may be interested in establishing interorganizational linkages for purposes other than increasing organizational performance, e.g., enhancing their own personal power, the focus of this paper is on the more widely discussed proposition that interorganizational linkages are established primarily on the basis of their anticipated instrumental value for enhancing organizational effectiveness.

It is clear from a review of the early development of the environmental control model that it was originally conceptualized at the organization-environment level of analysis rather than at the interorganizational level. The difference is that the former perspective leaves the mechanisms whereby an organization controls its environment unspecified, whereas the latter focuses explicitly on formal linkages between organizations. It is noted, however, that research on interorganizational relations at the dyadic, and organizational set level, typically has utilized an environment controlling framework. For instance, Aldrich (1976a) and Benson (1973, 1975) proposed that organizational administrators establish a network of relations for the purpose of maintaining an orderly and reliable flow of resources. Effective control of the environment is held to be a function of the centrality of an organization's location within a network of relations and its linkages with organizations outside the immediate network, e.g., support from a national federation (Benson, 1975; Levine & White, 1961; Rogers, 1974).

As noted previously (Whetten & Aldrich, 1979), this line of reasoning assumes that the decision to establish interorganizational linkages is the outcome of a very deliberate and thoughtful process. This is exemplified by a scenario in which an organizational administrator observes a decrease in organizational performance and concludes from his analysis of the problem that the organization needs to obtain resource Y which is supplied by organizations A and B. He proceeds to evaluate these alternative suppliers on the basis of their price, delivery time, stability of supply, etc., and then initiates an agreement with the organization proposing the most favorable terms. Although the rational decision making model has been strongly criticized (March & Simon, 1958; Weick, 1969; March & Olsen, 1976), the present purpose is not to argue that an administrator does not attempt to base his decisions to establish and maintain linkages on his perception of their contribution to organizational effectiveness. Rather, the objective is to draw attention to the multitude of factors that interfere with this type of deliberate, "rational" decision making process and



consequently to suggest limitations on the unbridled utilization of the resource control model in studies of interorganizational relations, especially in the public sector.

The rational model of decision making contains two key assumptions: (1) that the administrator has considerable freedom to choose between alternatives and (2) that he/she does so on the basis of what are generally considered to be rational/economic considerations. The authors' position is that, within the context in which linkages between public agencies are established, frequently these assumptions cannot be met. There are environmental conditions that restrict the autonomy of the administrators to choose freely between alternatives, and there are organizational conditions that restrict their use of rational criteria. One of the principal environmental constraints on the autonomy of public agency administrators is the fact that some linkages are essentially forced on participating organizations by third parties. This type of relationship can be the result of a legal directive or of a formal agreement between the heads of the respective federal or state systems to which the local agencies belong (Whetten, 1977; Hall, Clark, Giodano, Johnson, & Van Roekel, 1974; Aldrich, 1976b). It also may be stimulated by pressures from organized client groups or from leaders of local coordination councils as they push to improve the quality of the local social service delivery system. Additional programmatic related constraints on an administrator's discretion to initiate interorganizational relations include the size of his/her budget, the type of services the agency is mandated to provide, the number of staff allowed, and the number of organizations in the community (Whetten & Aldrich, 1979).

Regardless of the administrator's decision making autonomy, there are a number of internal organizational factors that may obstruct his/her inclination to utilize highly rational criteria in choosing between linkage alternatives. For example, the establishment of linkages that are less than optimal may result from staff biases regarding the legitimacy and status of other agencies, organizational traditions and precedents regarding the appropriate means for obtaining referrals and placing clients, and power struggles within the organization regarding the future image of the organization as reflected in its network of interorganizational linkages.

The fundamental purpose of this study, then, is to explore the obstacles faced by administrators in attempting to maximize the benefits and minimize the costs resulting from interorganizational relations. This will be done by testing three hypotheses regarding organizational contextual factors that impinge on the linkage establishment process. In addition, an examination will be made of cases in which the number of linkages an agency has established with a group of organizations (e.g., hospitals and health care clinics) is not consistent with the administrator's perceived instrumental value of that type of organization.

HYPOTHESES

It is expected that the degree to which an agency is interacting primarily with organizations of high instrumental value will be a function of three factors. These are the extent to which the staff of an organization have (1) a strong need to be selective in choosing partners for their interorganizational relations, (2) the opportunity to freely establish and discontinue relations with other organizations, and (3) the appropriate decision making mechanism.

The organizations selected for this study are commonly referred to as manpower agencies. These are public social service organizations that provide educational, training, and employment opportunities for the disadvantaged. Public agencies that operate federally or state sponsored social service programs are highly constrained by the hierarchical system governing their programs. Because the government (federal and/or state) is the principal source of funding, it exercises considerable control over the utilization of these funds by local agency directors. Specifically, it dictates the types of staff positions that can be funded and the types of services that can be dispensed to clients. Therefore, because social service agencies in a community operate within several different hierarchical systems, they are likely to differ in terms of the level of funding and the range of services they have been authorized to offer. In Whetten and Aldrich (1979) it has been demonstrated that a large financial resource base (budget) is conducive to establishing a highly diversified organization set. This finding is consistent with Litwak and Rothman's argument that "organizations with 'extra resources' are often best able to link with others" (1970, p. 156). In labor-intensive people-processing organizations (Hazenfeld, 1972) large budgets are converted into a large staff, which increases the organization's capacity to establish and maintain linkages. It also has been proposed that poor ties to resource bases outside the community will motivate an organization to establish linkages with other local organizations as a means of enlarging its resource base (Benson, 1975; Levine & White, 1961; Hage & Aiken, 1967). Because organizational resources (e.g., staff time) are required to establish new linkages, agencies with small budgets will have a high need for linkages but a small resource base for establishing them. Consequently, it is expected that organizations in this situation will examine carefully the instrumental value of a linkage before establishing it.

The need for being selective in establishing linkages also is stimulated by a wide scope of services. It has been shown (Whetten & Aldrich, 1979) that when an organization is providing a wide range of supportive services to its clients, in addition to basic services such as training, employment placement, and counseling, the organization interacts with a larger and more diverse set of organizations. For example, if an agency is providing medical examinations as an auxiliary service, it will need to establish linkages with local health organizations. This has important implications

for the care with which organizations select interacting partners. Establishing linkages with 50 organizations distributed evenly across 9 different categories (e.g., health, education, finance) is a more difficult task than if the organizations are all in 4 or 5 categories. This is because it generally is more difficult for an agency to establish a linkage with the first hospital than with the second or third. The first linkage provides knowledge about hospital programs and administrative policies, as well as acquaintances who can be used as references in the future. Consequently, it may be expected that given a fixed resource base (in terms of staff time) for interacting with other organizations, an agency offering a broad range of services to its clients would be highly constrained to interact only with those organizations that are perceived to have high instrumental value. The first hypothesis is, therefore:

Hypothesis 1: Organizations with a small budget and/or broad range of services will be more likely to interact with other organizations that have high instrumental value.

Perceived need alone, however, is not sufficient to guarantee that all linkages will have instrumental value. It is possible that an agency may be aware of excellent training and employment opportunities in other organizations but has difficulty placing its clients in them and therefore must settle for inferior alternatives. This lack of access may be caused by the poor image of the agency in the community. Benson (1975) has stressed that public agencies must establish a strong base of legitimacy among local community leaders as a prerequisite to obtaining resources controlled by other organizations. It has been shown that ratings by community leaders of the effectiveness of these agencies is strongly influenced by their familiarity with the members of the agency (Whetten, 1978). It thus follows that if a community organization announces a limited number of openings and several agencies are competing for these positions, preferential treatment will be given based on acquaintance and friendship.

In his original treatise on organization sets, Evan (1966) proposed that if boundary spanners have a large personal role set, then it is likely that their organization also would have a large organization set. This hypothesis was borne out by Whetten and Aldrich (1979), who found that one of the best predictors of the number of relations an organization had established was the activity rate of the staff in local fraternal types of organizations. This is consistent with Turk's (1973) proposal that voluntary organizations increase social integration in the community, providing people with information regarding the interests and resources held by others.

Increased visibility and legitimacy also may result from the staff members' previously holding positions in other local organizations. A request to establish an exchange coming from a former co-worker is more likely to be honored than one coming from a total stranger. This proposition is similar to Perrucci and Pilisuk's (1970) finding that community influentials hold positions in several organizations. As an extension of their

work, it is expected that personal influence may result not only from being linked to several organizations simultaneously, but also from sequentially holding positions in several organizations over time.

An organization set that includes many linkages that have relatively low instrumental value may result not only from the organization's inability to establish preferred linkages but also from its failure to discontinue less than optimal relationships that have been previously established. It is common for an organization to attract interactions because of its reputation or its control over scarce resources, e.g., the employment service's exclusive right to job placement. In these cases of interaction the focal organization may receive only marginal benefits compared to the resources it expends in maintaining the linkage. A strictly rational/economic model of decision making would argue that an organization in this position would discontinue the relationship. However, this may not take place if the organization has such a large set of relationships that it is difficult to assess continually the cost/benefit ratio of each linkage. When an organization has a very large organization set relative to its number of staff, the staff would have little time to evaluate reflectively the worth of their boundary spanning activities. Under these conditions it is likely that precedent and tradition would act as powerful forces for perpetuating the status quo.

Hypothesis 2: Organizations with small organization sets and staff members who have memberships in several voluntary organizations and have previously held several positions in other organizations will be more likely to interact with organizations that have high instrumental value.

The third factor likely to affect whether an organization establishes linkages of high instrumental value is whether or not it has established adequate structural mechanisms for internally disseminating environmental information and for making environment controlling decisions based on this information. Information regarding the desirability and undesirability of interacting with other organizations enters an organization by means of the various boundary spanning activities mentioned earlier. If information coming into an organization regarding such things as new job openings, alternatives to existing client exchange agreements, and planned changes in funding for local training programs fails to be channeled to the appropriate decision makers, then decisions to initiate or continue linkages with a less than optimal cost/benefit ratio may be made. In Whetten and Aldrich (1979) the number of staff meetings was shown to be a good predictor of the number of interorganizational linkages established. This suggests that staff meetings are used in the agencies studied as an important mechanism for exchanging information about the task environment.

An additional factor that is likely to influence the effectiveness of the decision making process is the level of centralization in the organization. It has been proposed that the authority to make decisions about how to control the environment through boundary spanning activities should be

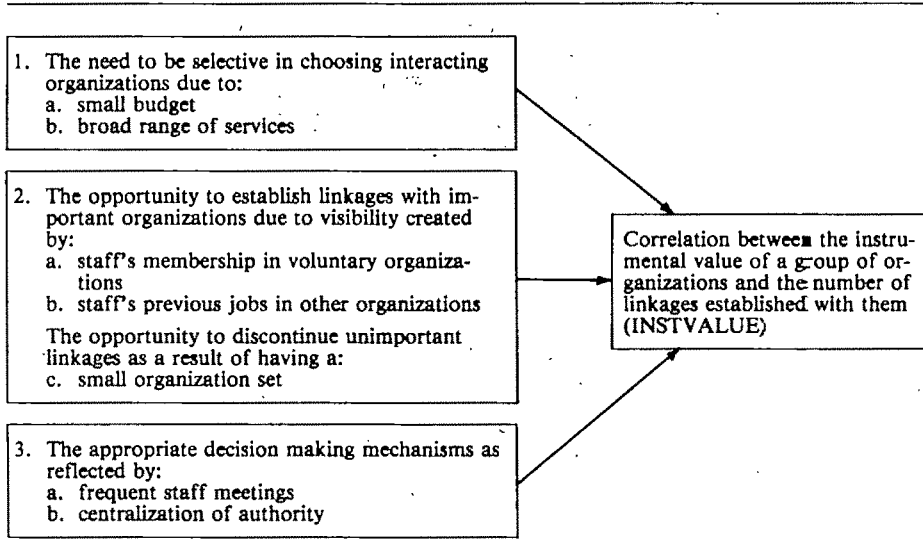
delegated to boundary spanners because they have the most accurate and current information about the environment (Hage & Aiken, 1967). However, decentralization of authority typically also results in a loss of scope in the decision making process. Although a particular boundary spanner may have very current information regarding opportunities for establishing linkages with certain organizations, he/she is not likely to be aware of alternatives discovered by other staff members. It also is possible that even if a boundary spanner is aware of all the alternatives available, the optimal alternative may not be selected because he/she has incomplete information about the history of interorganizational relations in the community. It therefore is important to note that this type of public agency tends to fill vacancies in senior positions by promoting its own personnel. Consequently, top administrators tend to have the longest tenure in the organization, and their knowledge of the stability and integrity of previous agreements with various organizations is an asset in choosing between current alternatives. For example, a community organization's history of unreliability in fulfilling commitments to the focal organization in the past might cause an administrator to veto a proposal from a less experienced staff member to initiate a joint program with that organization. If each boundary spanner were empowered to commit his organization to an exchange relationship, the resulting organization set likely would contain many redundant and less than optimal linkages. It is expected, therefore, that centralization of authority will result in an organization set with an overall higher quality of relationships because key decisions are based on a broad scope of information about the various resource controlling alternatives.

Hypothesis 3: Organizations with frequent communications via staff meetings and centralization of authority would be more likely to interact with organizations that have high instrumental value.

A summary of the three hypotheses is shown in Figure 1.

The hypotheses are essentially examining the *antecedents* of the linkage formation process, that is, the conditions under which perceived instrumental value influences the establishment of interorganizational linkages. A related question is, "What are the *consequences* of interorganizational relations on the staff's perception of their ability to control the environment?" It has been proposed that a large and diversified organization set would be beneficial to a people processing public agency because of its resource controlling potential (Whetten & Aldrich, 1979). A large part of the success of this type of organization is dependent upon its successful placement of clients in training and employment positions in other organizations. Therefore, the larger and broader its set of contacts in the community, the more degrees of freedom it would have for client placement (Jacobs, 1974). One way of testing this proposition is to ask the staff members how much control they feel the organization has over the environment. Their responses would be expected to be positively correlated with the size and diversity of their organization set.

FIGURE 1
Hypotheses Regarding the Factors That
Influence the Goodness of Fit Between Instrumental
Value and Number of Linkages



However, there are other influences beyond the effects of the objective characteristics of the organization set which also must be examined. For instance, it has been stressed that the resource controlling process itself consumes resources. Consequently, if an agency is interacting with many organizations because it must, because it has failed to recognize the inefficiencies of the current relationships, or because it is unable to gain access to more desirable alternatives, it is possible that the staff will not feel that their linkages with other organizations are very beneficial. This line of reasoning would suggest that perceived importance of the interacting organizations might serve as a moderating variable between the objective characteristics of the organization set and the staff's perception of the consequences of these interorganizational linkages. To test this, an examination was made of those cases in which there was a mismatch between the number of linkages established and the perceived value of interorganizational relationships. This could take two forms: (1) a large organization set with a low rating of the instrumental value of these linkages or (2) a small organization set with a high value placed on establishing relationships. In the first case the staff is likely to feel that their linkages have a poor cost/benefit ratio, and in the second case they may feel that they are unable to establish as many relationships with other agencies as they would prefer. In both cases the staff would be expected to report that their organization is being controlled by its environment, rather than vice versa.

Hypothesis 4: When considered by themselves, organization set size and diversity will be positively correlated with perceived control over the environment. However, this relationship is expected to be moderated by perceived importance of the linkages, to the extent that agencies that are interacting with many unimportant organizations or are unable to interact with many important ones will report that they are being controlled by their environment.

This hypothesis is similar to Pondy's (1977) proposition that people have high social power only when they can initiate interactions with others in their organization and at the same time buffer themselves from the initiatives of others. In the present study, at the organizational level, cases are examined in which organizations appear to be unable to initiate desired linkages, or they are vulnerable to the initiation of undesirable linkages by others.

METHOD

This study is part of a larger investigation of the manpower training system in New York State (Whetten, 1974). Information on 67 manpower agencies located in several New York communities (excluding New York City) was collected during the summer of 1973. The sample consisted of Employment Service offices, Neighborhood Youth Corps, MDT Skill Training Centers, and On-The-Job Training Programs. Two different survey instruments were used to collect data on the variables used in this study. Information about the internal operation and structure of each agency was obtained from questionnaires completed by the professional staff and the director. Information about an agency's interactions with other organizations was obtained from the director's responses to a master list of organizations for each community. The list included every known public and nonprofit organization located in the agency's community. It was compiled over a two year period from community directories supplied by local governments and social service coordinating agencies. The list was validated by asking the directors of the manpower organizations and the heads of the social service department and chamber of commerce in each community to check the list for omissions and errors several months before the study. Organizations contained on the master list were classified into nine categories, or sectors, comprising the agency's task environment, as follows:

1. Other manpower programs that are state or federally funded.
2. Education, training, and employment organizations, e.g., school and employment information centers.
3. Economic assistance organizations, e.g., social services departments or the F.H.A.
4. Public safety organizations, e.g., police and fire departments.
5. Recreation and entertainment organizations, e.g., Boy's Clubs or youth camps.

6. Medical and health care organizations, e.g., hospitals and nursing homes.
7. General social service organizations, e.g., Family Services, Senior Citizens Information Service, or the Salvation Army.
8. Administration, research, and central planning organizations, e.g., the mayor's office, city planning departments.
9. Special interest organizations, e.g., NAACP, Mental Health Association, the Better Business Bureau, the AFL-CIO. This category was not included in the analysis because of incomplete data.

The size of the organization set was computed by counting the number of organizations checked on the master list. The concentration of the set was computed using Herfindahl's '*H*' statistic (Adelman, 1969), which increases in value as the organizations in the set are concentrated in a few

sectors. The formula for the *H* statistic is
$$H = \frac{\sum_i^N \left(\frac{a_i}{A} \right)^2}{N}$$

A rating of the perceived importance of each of the nine sectors for the successful fulfillment of the agency's mission was obtained from the agency's director. Each sector was rated on a 7-point scale. To reduce the possibility that this rating might be biased by the number of interacting organizations identified in each sector by the agency heads, they were not informed of the particular sector into which each organization on the master list had been classified. In addition, the master list and the questionnaire were not administered simultaneously. The perception of the organization's control over its environment was measured by asking the agency's director to respond to a survey question with a 7-point response scale ranging from "the environment dominates the organization" to "the organization dominates its environment." The questions measuring the instrumental value of each sector and the organization's control over its environment actually were asked of all the professional staff members. However, the decision was made to use only the agency director's responses for the following reasons: (1) By the use of an analysis of variance test, it was found that the agency directors' responses were not significantly different from the average response of the rest of the staff. (2) This approach avoids using the questionable technique of aggregating purely perceptual data to form an organizational score. (3) Because the agency director filled out the master list for his/her organization and because precautions had been taken to avoid contamination between the instruments, there is an advantage in using the agency director's rating of the sectors in order to hold constant the respondent's familiarity with the organization set. (4) As indicated earlier, the agency director tends to have the longest tenure in the organization and would appear to be the most reliable informant (Seidler, 1974).

The relationship between the perceived importance of the organizations in the nine sectors of the task environment and the number of linkages with organizations in each sector was measured by computing the Pearson

correlation coefficient between the two sets of nine scores for each of the focal manpower organizations. This variable is labelled INSTVALUE, for instrumental value.²

Because of the nature of the particular internal organizational characteristics used for independent variables, e.g., the staff's participation in decision making and their activity in local voluntary organizations, it seemed unwise to rely on a single response from the agency director (Seidler, 1974). Consequently, measures were designed using aggregated responses from the entire staff. Their operationalizations follow:

Organization set size: The total number of local organizations, public and nonprofit, with which a focal manpower organization interacts.

Budget: The amount of money allocated to an agency for the 1972-73 fiscal year by the state or federal government. The individual employment service offices did not have a separate budget. Their operating expenses were figured by multiplying their number of staff times an average salary and overhead amount supplied by the state office.

Breadth of services offered: Staff members were asked how often they dealt with the following aspects of their clients' lives: Medical problems, family relationship, other social problems (e.g., related to their work or neighborhood), economic problems, educational needs, experience, psychological characteristics, plans, and dreams. Four response categories ranged from "every time we meet with them" to "never."

Voluntary association memberships: The average number of civic action organizations (e.g., NAACP, Settlement House Board) the staff members belong to.

Previous jobs in other organizations: The average number of previous jobs the staff held in the following types of organizations: employment service, other manpower organizations, business organizations, public agencies, education organizations, other community service type organizations.

Staff meetings: The number of regularly scheduled meetings within an organization per month.

Centralization of authority: The staff members' average response regarding how often they participated in making the following decisions: (1) to promote any of the nonclerical staff, (2) to hire new

²Also computed was a second INSTVALUE measure, which consisted of the correlation between the perceived importance of a sector and the average intensity of relationships with organizations in that sector under the assumption that these would be independent but complementary measures. However, it was found that the two INSTVALUE variables were highly correlated and consequently the regression analyses for both were very similar. Consequently, it was decided to use the measure based on number of linkages, since it was felt to be a better operationalization.

staff members, (3) to adopt new policies, and (4) to adopt new programs. Responses were coded on a 5-point scale from "never" to "always."

For a discussion of the aggregation procedure used for these variables see Whetten and Aldrich (1979).

A comment needs to be made about the use of perceptual data in this study. Historically, perceptual data collected from a single rater about different attributes of single or multiple objects have been shown to include response-response, or intra-rater bias (Lawler, 1967). It therefore is important to note how this problem was handled in this study. First, while perceptual data from agency directors were used in constructing the principal dependent variable (INSTVALUE), they were combined with a fairly objective variable (number of linkages in the organization set). Second, the perceptual data used in constructing the independent variables were collected from staff members rather than agency directors. Consequently, the perceptual data used in constructing the dependent and independent variables were collected from two different groups of respondents. In addition, the two groups of respondents were asked questions about very different objects, or referents, namely, the characteristics of the focal organization (independent variables) and the importance of other agencies (dependent variable).

RESULTS AND DISCUSSION

The correlation between the perceived importance of a sector and the number of linkages with organizations in that sector for each agency ranged from $-.07$ to $+.92$, with a median value of $.34$. This range of correlations represents a wide variance in the goodness of fit between the perceived utility of an agency's linkages and the number of linkages it has established, and it underscores the need for a better understanding of the factors that impinge on the linkage establishment process.

To test the hypotheses about the factors affecting the degree to which interorganizational relations are established for their instrumental value, a regression of INSTVALUE on the organizational variables shown in Figure 1 was performed. The results of this analysis are shown in Table 1. Overall, they provide strong support for Hypothesis 1 and moderate support for Hypotheses 2 and 3. As predicted, the relationship between the number of linkages with a set of organizations and the focal organization's perceived importance of that group is greatly influenced by the size of the organization's financial base and the breadth of services it provides. The need to establish relations with a broad range of organizations on a small budget therefore appears to be a significant precondition for a highly deliberate, rational, decision making process.

Table 1 provides less support for Hypothesis 2 about an organization's opportunity to establish relations freely and to discontinue relations.

Visibility resulting from previous jobs appears to provide greater information about, and access to, the resources of other organizations than does visibility resulting from membership in local voluntary organizations. These results suggest that a person's latent role set based on past acquaintances is more salient for gaining access to other organizations than are his current personal associations. However, the two measures of the staff's role set also varied in terms of job versus non-job activities, and further research in this area needs to be conducted before a definite conclusion can be reached. It does appear, however, that the results here and in Whetten and Aldrich (1979) point to definite opportunities for organizational leaders to capitalize on the personal role sets of their staff members.

As part of this hypothesis it was proposed that an organization with a large set may find it difficult to continually discard unproductive relationships. The significant beta of $-.19$ in Table 1 underscores the fact that a large set size has both costs and benefits. It reduces the focal organization's dependence upon a small number of organizations, but it appears also to create new environment management problems because it is difficult to make continual assessments of the current value of a large number of commitments. The result may be a classic problem of the means becoming an end in and of itself as the perceived value of linkages decreases but the relationships are perpetuated.

TABLE 1
Regression of Organizational Characteristics
on INSTVALUE

Dependent variable	INSTVALUE $R^2 = .24$
Size of budget	$-.28^{***}$
Breadth of services	$.36^{***}$
Voluntary association	$-.15$
Previous jobs	$.22^*$
Set size	$-.19$
Centralization	$.22^*$
Staff meetings	$.14$

$N = 67$

* $p \leq .10$

** $p \leq .05$

*** $p \leq .01$

The results in Table 1 also provide partial support for Hypothesis 3. It appears that for these organizations the number of staff meetings is not significantly related to the instrumental value of their organization set. This may be because staff meetings are not used in these agencies as a means of communicating information about the task environment or because this type of communication is not taking place at all. The number of staff meetings was shown to be an important predictor of organization set size (Whetten & Aldrich, 1979). Thus it may be that general organization/environment information (the need for more training openings to

meet an increased demand from clients) may be exchanged in the meetings but not details about specific linkage possibilities.

As predicted, centralization is positively related to INSTVALUE. It appears that in social service agencies it is important for linkage formation decisions to be made by the senior staff members. They generally have the longest tenure in the agency, and they are likely to be most familiar with past and current interorganizational relations. This knowledge base serves as a check on the information regarding new opportunities for linkages obtained by less experienced boundary spanners.

The effect of a large and diversified organization set on the staff's perception of their ability to control the environment (Hypothesis 4) is shown in Table 2. A large and diversified (the opposite of concentrated) organization set is positively associated with the staff's perception that the organization is controlling its environment. Considered by themselves, these results would suggest that irrespective of why a linkage was established, the nature of the relationship, or the importance of the interacting organization, it is perceived to increase the organization's control over its environment.

TABLE 2
Correlation Between Organization Set
Characteristics, Perceived Importance of
Interacting Organizations, and Perceived
Control over the Environment

<i>Organization Set Characteristics</i>	<i>Perceived Organizational Control over Environment</i>
Concentration of organization set	+ .28*
Size of organization set	+ .38*
Perceived importance of task environment	-.05
Interaction term: Large organization set and low perceived importance	-.48***†
Interaction term: Low number of linkages and high perceived importance	+ .36***†

†Controlling for size of organization set and perceived importance of task environment.

* $p \leq .05$

** $p \leq .01$

*** $p \leq .001$

To test the validity of this conclusion, perceived importance was used as a moderator for the relationship between the number of linkages and environmental control. A dummy variable was created to represent the interaction between the number of linkages and the perceived importance of the task environment by splitting both variables at their median value and assigning weights of 0 or 1 to form the interaction terms high number of linkages/low importance and low number of linkages/high importance. If perceived importance is not acting as a moderating variable, then the partial correlations (controlling for the main effects of number of linkages

and perceived importance of the task environment) between these interaction terms and perceived environmental control should be similar to the + .36 correlation for number of linkages alone. Table 2 shows that this clearly is not the case. The correlation for the high linkages/low importance condition is -.48. This reversal in the sign of the correlation indicates that when organizations are interacting extensively with unimportant organizations they feel powerless. This is a very significant finding. It confirms hypothesis 4 and reinforces the importance of the earlier results in Table 1, pointing out dramatically the need to examine organizational and contextual conditions that affect an organization's ability to interact with only those organizations that it perceives to be instrumental to its success.

The correlation of + .36 for the other interaction term, low number of linkages/high importance, is somewhat troubling. It was hypothesized that agencies not interacting with organizations perceived as having high instrumental value would report the same sense of powerlessness that was found in the high number of linkages/low importance condition. It appears, however, that just the opposite is the case. It was postulated that agencies unable to establish linkages with a large number of highly important organizations might be able to compensate for this lack of total access by increasing the intensity of the linkages that they are able to initiate. If each of the relatively few linkages established with important organizations represents a highly intense exchange relationship, then the focal organization may report that it is able to control its environment, as reflected by the + .36 correlation in Table 2. To test this possibility, an analysis of variance test was used to measure the relationship between the two dimensions, number of linkages and perceived importance, and three measures of linkage intensity that reflect the number of different client and institutional services provided by the interacting organizations (Marrrett, 1971). The master list of organizations survey asked each agency head to identify the number of different services provided by each interacting organization for the focal agency's referrals. These included counseling, basic education classes, medical or rehabilitative services, on-the-job training, job placement, diagnosis and testing, and vocational training. They also were asked to identify all institutional services they received from each interacting organization, including funding, physical facilities for offices or training, and assistance in program planning and development. The third measure of intensity was a composite of all client and institutional services provided by the interacting organization. For example, if a manpower organization is sending its clients to agency A for diagnostic testing, counseling, and job placement and its staff also is receiving assistance on program development, that is a more intense relationship than one with agency B which is only providing counseling services.

This analysis indicated a strong main effect for perceived importance for two of the three measures of intensity—institutional services $F = 7.42$ (1, 47) $p \leq .01$; total services (client + institutional) $F = 3.86$ (1, 47)

(1, 47) $p \leq .01$; total services (client + institutional) $F = 3.86$ (1, 47) $p \leq .05$ —and a consistent pattern for the third. The main effect for number of linkages and the interaction effect were not significant. These results indicate that the intensity of a relationship is based on the perceived importance of the interacting organizations. It is of particular note that the highest mean value for all three intensity measures occurs in the high importance/low number of linkages condition. This provides some support for the proposition that increased intensity is used as a strategy for controlling the environment when the focal organization is not able to interact with a large number of particular groups of organizations that it perceives to be important. This result again reinforces the utility of studying the conditions that enhance an organization's ability to establish linkages with organizations it perceives to be instrumental to its success.

IMPLICATIONS AND CONCLUSIONS

There are several implications of these findings for agency and program administration. First, they point out the substantial impact of federal (or state) level program policies on the administration of local agencies. In Whetten and Aldrich (1979) it was shown that the best predictors of organization set size and diversity are those most difficult for agency heads to manipulate. This appears also to be the case for organization set optimization, because the two best predictors for INSTVALUE, budget and breadth of services, are determined essentially by program guidelines established by state or national administrators. Unfortunately, it is difficult to make an unequivocal statement regarding the effect of budget size on interorganizational relations. On the one hand, a large budget has been shown to lead to a diversified organization set (Whetten & Aldrich, 1979), which is perceived by the agency director as being beneficial to the organization. On the other hand, it also appears that a small budget produces a more efficient utilization of financial resources by avoiding the problem of accumulating a large number of linkages with organizations of low importance. This apparent paradox faced by program administrators bears further research before a definitive conclusion can be reached.

A second implication of these results is that the decision by program heads to mandate a relationship between certain local agencies may also prove to be a mixed blessing to these agencies. Although Aldrich (1976a) and Hall et al. (1974) have shown that mandating a relationship increases the frequency of interaction between the organizations, the present study suggests that it also might create within an agency a perception of low power over its environment. This concern is borne out in Hall et al.'s (1974) study in which the correlation between mandated relations and the power of the focal organization was .15, whereas the correlation between mandated relations and the perceived power of the interaction organization was .49. An illustration of this phenomenon appeared in research on relations between manpower organizations by Benson, Kunce, Thompson, & Allen (1973). They found that, as part of its strategy for increasing

its share of the distribution of resources within the network of community organizations, a welfare agency was deliberately flooding a rehabilitation agency with referrals that would create high administrative costs and a low success rate. It has been demonstrated repeatedly that under such conditions organizations view the relationship as a threat to their autonomy and consequently are reluctant to maintain more than a token relationship (Whetten, 1977; Crow, 1970; Mansur, Jones, & Ortof, 1967). The results of such demonstrations suggest that the current trend toward decentralization of manpower services, which gives administrators of local agencies more latitude to adapt their program to local conditions (including agencies with which they will interact), will instill in their staff greater confidence in their ability to control their task environment.

Implications for future research and further theoretical development also are apparent in these results. First, it is evident from the rather modest R^2 in Table 1 that much of the variance in INSTVALUE remains unexplained. Therefore, although this research has generated some information regarding the factors that influence the establishment of environment controlling linkages, it is recognized that considerably more research on this topic must be conducted. It would seem particularly important for future studies in this topic to include measures of the qualitative characteristics of the exchange processes within the organization set. Marrett (1971) has identified four key dimensions of interorganizational relations: intensity, reciprocity, formalization, and standardization. It would be particularly instructive to examine the moderating effect of standardization on the relationship between set size and INSTVALUE as a standardized relationship would require fewer resources to maintain. Presumably an organization therefore could effectively handle a larger organization set if the linkages were highly standardized.

These results, along with those from Whetten and Aldrich (1979), also suggest the need for further research on the utility of applying the resource control model to the organization set level of analysis. It appears that although the most important determinants of the composition of an organization set are difficult for administrators to control, under certain conditions the decision to establish resource controlling linkages may follow the highly deliberate and thoughtful process implicit in the resource control theory.

Finally, these results suggest that research in this field needs to be more sensitive to the negative effects of interorganizational relationships. Although Evan (1966), Pondy (1977), and Thompson and McEwen (1958) have all noted the trade-off between interaction agreements and loss of autonomy to participants, little research has focused on this dysfunctional consequence. The results of the present study suggest that when organizations must engage in relationships that they do not prefer, they feel more threatened than when they are unable to participate in relationships which they desire. This conclusion calls into question the practice of making attributions about the amount of power an organization has based simply

on the size of its organization set or its central location in a network of relations, because many of the connecting linkages may be perceived as liabilities rather than assets.

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The Similarity of Individual Directed and Group Directed Leader Behavior Descriptions

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The similarity between individual directed and group directed leadership descriptions of subordinates was examined among 308 public utility employees. The correlations among the variables revealed extensive similarity in the two sets of leadership descriptions and almost identical correlations with 10 different dependent variables.

Research on the effects of leader behavior seems to have undergone a change in perspective over the past 20 years. Initially, leader behavior was measured on a work group basis, by averaging descriptions obtained from subordinates about leader behavior directed towards the work group as a whole. The assumption underlying this measurement method was that "the behavior of the leader is in fact reasonably constant for all staff members" (Seeman, 1957, p. 95); differences in subordinate descriptions of the same leader therefore were attributable to measurement error which could be minimized by averaging their descriptions (Graen, Dansereau, & Minami, 1972). The dependent variables typically used in these studies were group or averaged productivity or satisfaction measures (Kerr & Schriesheim, 1974).

Recent research, however, has called into question the constancy of leader behavior towards different subordinates (e.g., Lowin & Craig, 1968) and suggests that averaged descriptions may produce fictional mid-range leadership scores and research findings that are little more than artifacts of measurement. In recognition of this possibility, nearly three fourths of all recent research in the area (e.g., House, 1971; House & Dessler, 1974) has not employed the averaging method and, instead, has attempted to focus on dyadic relationships between the leader and individual subordinates (Hunt, Osborn, & Schriesheim, 1978). However, as noted by Schriesheim, House, and Kerr, many items on currently used leadership scales, such as those developed at Ohio State or the University of Michigan (Fleishman, 1957; Taylor & Bowers, 1972; Halpin, 1957b;

Stogdill, 1963), "ask subordinates to describe the leader's behavior toward the *group* rather than toward the individual furnishing the description" (1976, p. 316), so that despite dyadic statistical analysis, an average or group measure of leadership is still being used. Thus, these newer studies are relating group oriented leadership variables to individual level subordinates outcome variables, making the interpretation of results unclear and rather difficult.

Graen and Cashman also have noted that despite the shift to dyadic analysis, "the items used [on current leadership measures] ... are predominantly of the type which indicate a homogeneous [group] behavioral pattern" (1975, p. 149). Dansereau and Dumas comment further that "the result of averaging or not averaging a general [group] measure is still a measure of general [group] behavior and will remain as such until questions are focused upon behavior directed at the individual" (1976, p. 10). Dansereau and Dumas also note that "the above inconsistency makes it impossible to draw logical inferences from data" collected by group questions and analyzed at the individual level (p. 11), and suggest that leadership researchers use only measures of individual directed leadership in dyadic leadership analyses.

Dansereau, Graen, and Haga go one step further. They criticize studies that seek to relate group oriented leader behavior descriptions to group level outcome variables. They state that "leadership can occur only in the vertical [leader-individual subordinate] dyad" (1975, p. 76). Similarly, Graen and Cashman claim that for leadership research "the appropriate level of analysis is not the work unit ... but the vertical dyad" (1975, p. 150).

Cummings, however, seems to argue for a middle ground between the group and individual approaches to leadership research. He notes that:

Graen and Cashman [1975] criticize previous models for assuming homogeneity of ... leader ... behaviors. Graen and Cashman argue that heterogeneity is a "better" (presumably more realistic) assumption. I am inclined to argue that heterogeneity is equally as unrealistic as homogeneity when describing leader behaviors. ... Leaders do not behave differently toward each subordinate for at least two reasons: (a) equality considerations aimed at countering accusations of preferential treatment, and (b) time and energy costs associated with the diagnosis necessary to behave heterogeneously (1975, p. 184).

Although not extensive, some correlational data support this position. It shows that there is a *moderate* amount of agreement in the way subordinates describe their leaders. Interrater correlations group around .6 (Evans, 1970; Fleishman, 1957; Fleishman, Harris, & Burt, 1955; Halpin, 1957b). Several analyses of variance also have indicated that "subordinates differ more in describing different leaders than in describing the same leader" (Halpin, 1957a, p. 66). Thus, it may be that although leaders act somewhat differently towards individual subordinates, each leader also has a more general behavioral pattern that subordinates recognize and respond to. If this is the case, subordinate descriptions of group directed and individual directed leader behavior would tend to be highly similar.

They also would tend to be similar if subordinates use stereotypes or implicit leadership theories in making their descriptions, as has been suggested by Rush, Thomas, and Lord (1977).

The current investigation was undertaken in an attempt to help shed light on this issue: Do subordinates describe leader behavior towards their co-workers in essentially the same manner as they describe leader behavior towards themselves? In other words, what is the relationship between subordinate descriptions of group directed and individual directed leader behavior? Clearly, it can be argued at length whether leaders actually behave the same or differently towards their subordinates, or whether group oriented or individual oriented leader behavior descriptions *should* be obtained from subordinates. However, if subordinates do not make such distinctions in providing leader behavior descriptions, such arguments may be merely academic. Because this is an empirical question that has not been addressed, the current study was undertaken.

METHOD

Sample

The sample consists of 308 managerial and clerical employees in a regional operations division of a large public utility (a 93 percent usable response rate). The five hierarchical levels contained in the sample consist of unit managers, assistant unit managers, supervisors, senior clerks, and junior clerks. (Separate analyses were performed for each level and revealed no substantial differences in results; only combined findings therefore are reported.)

Interviews and observation, as well as questionnaire data, provide the following description of the organization. In general, the division is structured in a more mechanistic than organic manner (Burns & Stalker, 1961) and faces a high degree of technological and environmental certainty. Control of the division is strongly centered in the headquarters office of the company. Throughout the division there is a high degree of standardization, with well-defined job classifications and job descriptions that are carefully communicated to all employees. The lower levels exhibit a high degree of formalization and reliance on rules. The higher organizational levels also rely on standard operating procedures and have only moderate levels of managerial discretion in most nonpersonnel areas. There also is frequent checking on their activities by higher organizational levels.

One difficulty arising from the use of this particular sample is that it could be argued that in this organization one might not expect to find individualized treatment of subordinates, and that this could account for any obtained similarities in group oriented and individual oriented leadership descriptions. However, despite the high degree of formalization and structure in this organization, leaders were allowed substantial discretion in their handling of subordinates. This is reflected in the fact that for 42 of the 43 supervisors described by the 308 respondents there was more

variance in individual oriented consideration and structure descriptions than in group oriented descriptions. Also, the estimated variance for the total sample as a whole was substantially greater for individual oriented consideration ($\hat{\sigma}^2 = 70.73$) and structure ($\hat{\sigma}^2 = 60.06$) than for group oriented consideration ($\hat{\sigma}^2 = 53.63$) and structure ($\hat{\sigma}^2 = 39.94$). Finally, it should be pointed out that Graen and his associates (Dansereau et al., 1975; Graen & Cashman, 1975) do not state any limiting conditions to their claims about the superiority of individual (dyadic) approaches to the study of leadership. Therefore, it might be argued that even if leaders were not given discretion in this organization to treat subordinates differently, a useful test of Graen and his associates' ideas could still result.

Procedure

The questionnaire was pretested on a sample of managerial and clerical personnel from a different division of the company. The final version of the questionnaire was identified as part of a confidential university survey of organizations, and anonymity was guaranteed (no names were requested). The questionnaires were administered individually through the company mail, and each respondent sealed and returned his/her own questionnaire in a self-addressed envelope directly to the university.

Measures

Two measures of group directed and two of individual directed perceived leader behavior were administered to the respondents, along with ten other measures of group and individual level outcome variables.

Group directed leader behavior. Group directed leader behavior perceptions were measured by the consideration and initiating structure subscales of Form XII of the Leader Behavior Description Questionnaire (LBDQ) (Stogdill, 1963). The instructions were modified slightly to emphasize further to the respondents that they were to describe how they saw their leader behave towards the work unit members *as a group*. This minor modification in the instrument was made to ensure that the respondents clearly understood exactly what they were to describe. For reviews on these measures, see Schriesheim and Kerr (1974, 1977).

Individual directed leader behavior. Individual directed leader behavior perceptions were measured by a modified version of Form XII of the LBDQ. The instructions were changed to ask the respondents to describe their perceptions of how their leader acted towards them *as individuals*, and it was emphasized that these descriptions could be different from those provided concerning the work unit group. Similarly, each item in the LBDQ was slightly modified to pertain more directly to individual oriented leader behavior. A factor analysis of the items supported a two-dimensional (consideration and structure) solution, and acceptable internal consistency reliabilities and item analysis results were obtained for the new measures (Schriesheim, 1976).

Job satisfaction. Job satisfaction was measured by the Job Descriptive Index (JDI) (Smith, Kendall, & Hulin, 1969). However, because leader behavior would be expected to impact most strongly on satisfaction with supervision, only this dimension, in addition to total job satisfaction (the sum of all five JDI subscales), is used here. The JDI has been subjected to extensive refinement and validity examination, generally with positive results (e.g., Gillet & Schwab, 1975).

Productivity. The respondents rated the productivity of their work units using Mott's (1972) 8-item measure. In addition, seven of the items were slightly modified to have the respondents also provide self-ratings of their (individual) productivity. The instructions for the unit ratings were identical to Mott's, but those for the individual ratings were slightly modified (to emphasize the difference between the individual and group ratings). Validity and reliability data are reported by Mott (1972). Coefficient alpha internal consistency reliabilities of .88 and .84 were obtained for the group and individual ratings, respectively, in the current sample.

Motivation. Patchen's (1965) 4-item scale was used to obtain respondent descriptions of their (individual) typical daily levels of job related motivation. Validity and reliability data are provided by Patchen (1965, pp. 26-35), along with a number of significant positive correlations with objective performance and motivational criteria.

Group drive and cohesiveness. Group drive, the level of work group arousal toward organizational task-goal accomplishment, was measured by Stogdill's (1965) 5-item scale. This variable was examined to provide a group oriented counterpart to the individual motivation variable discussed earlier. Group cohesiveness, the degree of member attraction to the group, also was measured by a 5-item scale developed by Stogdill. The manual for both measures (Stogdill, 1965) reports validity and reliability information, and several recent studies have obtained significant predictive correlations using these scales (e.g., Greene, 1976).

Anxiety. On-the-job anxiety was measured by Spielberger, Gorsuch, and Lushene's (1970) 20-item state anxiety subscale of the Trait-State Anxiety Inventory. A short sentence was added to the instructions, as suggested by Spielberger, requesting that the respondents complete the subscale describing "how you usually feel on your present job" (1972, p. 37). According to Spielberger, state anxiety "may be conceptualized as consisting of unpleasant, consciously-perceived feelings of tension and apprehension" (1972, p. 29). Data pertaining to the validity and reliability of this instrument are presented in Spielberger (1972) and Spielberger et al. (1970).

Role clarity and role conflict. Role clarity (the degree to which respondents see their work role demands as unambiguous and predictable) and role conflict (the degree of perceived incompatibility in other-expected role behaviors) were measured by Rizzo, House, and Lirtzman's (1970) 6-and 8-item scales, respectively. These measures have been shown to be factorially independent and to have reliabilities in excess of .70 in several

samples. Data concerning the validity and reliability of these instruments are presented in Rizzo et al. (1970).

Method of Analysis

To determine the degree of similarity in perceived group directed and individual directed leader behavior, the four leadership measures were inter-correlated using individuals as the level of analysis (no grouped data were employed). The group and individual leadership variables were also correlated with the ten group and individual level outcome variables in order to determine whether they obtain similar or different relationships. (Prior to these analyses, the 14×14 variable intercorrelation matrix was factor analyzed using the principal axis method with varimax rotation. Using normal distribution of residuals, scree, or eigenvalue-one tests [Harman, 1967], from 6 to 8 factors could be justified. However, no general factor was apparent, suggesting a lack of substantial method variance to confound the interpretation of results.)

Finally, the pattern of inter-item correlations among the individual directed and group directed leadership descriptions was examined to see whether similarity exists at the level of specific behaviors (items). This last examination was accomplished by computing and examining average inter-item correlations and by factoring the matrix of intercorrelations among all the individual and group oriented items (together as a set), using the principal axis method with squared multiple correlations (R^2) as communalities and a varimax rotation.

TABLE 1
Correlational Results

Variable	Coefficient Alpha	Correlation with			
		Group		Individual	
		Structure	Consideration	Structure	Consideration
Group structure	.85	—	—	—	—
Group consideration	.91	.26***	—	—	—
Individual structure	.82	.77***	.27***	—	—
Individual consideration	.92	.19***	.89***	.31***	—
Group productivity	.88	.21***	.36***	.20***	.37***
Group cohesiveness	.90	.15**	.46***	.12*	.45***
Group drive	.86	.17**	.56***	.17**	.53***
JDI total satisfaction	.93	.18***	.68***	.20***	.68***
JDI supervision	.88	.25***	.82***	.25***	.78***
Individual productivity	.84	.15**	.17**	.13*	.22***
Motivation	.57	.00	.19***	.01	.20***
Anxiety	.91	-.09	-.47***	-.06	-.45***
Role clarity	.75	.48***	.28***	.41***	.26***
Role conflict	.77	-.10*	-.26***	-.06	-.22***

* $p < .05$

** $p < .01$

*** $p < .001$

RESULTS

Table 1 presents the correlations and coefficient alpha internal consistency reliabilities for the measures (all reliabilities exceed .70, except that for motivation).

Group and Individual Leadership Relationships

The top four lines of Table 1 present the intercorrelations among the leadership measures. A high degree of similarity exists between respondent descriptions of group and individual oriented structure (.77) and consideration (.89), representing 59 percent and 79 percent shared variance, respectively. The other leadership correlations, on the other hand, although statistically significant, represent substantially less shared variance (none greater than 10 percent). Thus, these correlations show a high degree of convergence in descriptions of consideration and structure and relatively little convergence across consideration and structure.

Relationships with Outcome Variables

The last ten lines of Table 1 present the correlations between the group and individual oriented leadership and outcome variables. The group oriented leader behavior measures do not correlate more highly with the group outcome measures (group productivity, cohesiveness, and drive) than do the individual oriented measures (the differences in correlations are both trivial and nonsignificant). Similarly, the individual oriented leader behavior measures do not correlate more highly with the individual outcome measures (total satisfaction, supervision satisfaction, productivity, motivation, anxiety, role clarity, and role conflict) than do the group oriented measures.

Item Similarity

To compare the degree of overlap across group and individual leadership constructs, average inter-item correlations were computed for structure and consideration (using the Fisher r -to- Z transformation). Three averages were computed for structure and consideration (separately): (1) the average correlation among only group directed items, (2) the average correlation among only individual directed items, and (3) the average correlation among all the items—both group directed and individual directed. The results obtained were .35, .32, and .32, respectively, for structure and .50, .53, and .51 for consideration. This clearly shows a high degree of similarity. The three average correlations for structure or consideration are within $\pm .03$ of each other. Also, the average correlations between the 10 individual directed and the 10 group directed items measuring the same leader behaviors were calculated and found to be .56

TABLE 2
Factor Analysis Results^a

<i>Group Oriented Item Factor Loadings</i>					<i>Individual Oriented Item Factor Loadings</i>				
<i>Item</i>	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>	<i>Item</i>	<i>I</i>	<i>II</i>	<i>III</i>	<i>IV</i>
1	---	.73	---	---	21	---	.64	---	---
3	---	.32	.36	.35	23	---	.30	.34	.57
5	.34	.47	---	---	25	.56	---	---	---
7	---	.66	---	---	27	.31	.60	---	---
9	.38	---	.49	---	29	.30	---	.53	---
11	---	.40	.50	---	31	---	---	.51	---
13	---	.67	---	---	33	---	.62	---	---
15	---	---	.67	---	35	---	---	.72	---
17	---	.62	.37	---	37	---	.61	.30	---
19	---	.36	.41	.35	39	---	---	.39	.59
2	.82	---	---	---	22	.85	---	---	---
4	.66	---	---	---	24	.77	---	---	---
6	.69	---	---	---	26	.71	---	---	---
8	.82	---	---	---	28	.83	---	---	---
10	.54	.40	---	---	30	.60	.33	---	---
12	.50	---	---	---	32	.54	---	---	---
14	.73	.30	---	---	34	.78	---	---	---
16	.61	---	---	---	36	.75	---	---	---
18	.72	---	---	---	38	.69	---	---	---
20	.74	---	---	---	40	.68	---	---	---

^aAll 40 items were factored together as a group, and four factors extracted from the item intercorrelation matrix (group oriented and individual oriented items that are measuring the same behavior are presented side by side to facilitate comparison; see the text for discussion). The items are numbered according to their order of appearance on the LBDQ Form XII (Stogdill, 1963). Odd-numbered items measure initiating structure; even-numbered items measure consideration. Loadings below .30 have been omitted to facilitate interpretation of results.

for structure and .68 for consideration. Thus, this clearly supports the analyses reported above. There is more agreement between items measuring different constructs (individual or group directed leadership) but the same behaviors (items) than there is in measuring the same constructs but different behaviors.

To clarify further the degree of similarity among group directed and individual directed leader behavior description items, the factor analysis presented in Table 2 was undertaken. Normal distribution of residuals, scree, and discontinuity tests were performed to determine the appropriate number of factors to extract (Harman, 1967). Using these tests, either two or three factors could be justified. However, because the eigenvalues of the first four unrotated factors exceeded 1.00 (they were 12.63, 6.15, 1.28, and 1.01), and because one could theoretically argue that four factors should be extracted to maximize the likelihood of obtaining two group directed (structure and consideration) and two individual directed factors, four factors were in fact extracted and rotated. (Extracting and rotating either two or three factors from these data produces clearer-cut results which strongly indicate a very high degree of similarity between group directed and individual directed leadership descriptions. The two factor results show the emergence of one consideration and one structure factor,

with both the individual and group items loading on their appropriate factors. No individual or group behavior factors were obtained. The three factor results are highly similar to the two factor results, except that the structure items load on two different factors. Again, no individual or group behavior factors were obtained.)

As shown in Table 2, the results of this factor analysis generally support the average inter-item correlational findings. Here it can be seen that all of the consideration items load highly on Factor I and that only three items (10, 14, and 30) have loadings on other factors. In fact, two of these items with "stray" loadings (10 and 30) are group oriented and individual oriented items measuring the same leader behaviors, and both have their secondary loadings on the same factor (II). Clearly, then, the results show a high degree of similarity in consideration descriptions across the group and individual items.

At first glance, the structure results shown in Table 2 may seem to conflict with the results obtained thus far. However, closer examination reveals that this is not the case. Although it is clear that the structure items load on more than one factor, this is not unusual. The LBDQ Form XII structure scale has been shown to break into as many as four different factors in previous analyses (Schriesheim & Kerr, 1977). It is noteworthy, however, that the loading patterns are identical for six sets of group (1, 3, 9, 13, 15, and 17) and individual (21, 23, 29, 33, 35, and 37) items measuring the same leader behaviors. In addition, for one set of items (19 and 39) four of the five total loadings are near identical, and for the remaining three sets of group (5, 7, and 11) and individual (25, 27, and 31) items two out of three loadings are shared. Thus, although these results are weaker than those obtained for consideration, it seems clear that group oriented and individual oriented leadership descriptions are nearly identical even at the level of specific behaviors (items).

DISCUSSION

Taken as a whole, these results of this study appear to have several important implications for future leadership research. They would seem to suggest that although the arguments advanced by Dansereau and Dumas (1976), Graen and Cashman (1975), and others (concerning the need for individual oriented leader behavior measurement) may be theoretically meaningful, they also may be of little practical (empirical) consequence. As shown in this study, (1) a very strong relationship exists between individual oriented and group oriented leader behavior descriptions and (2) both types of measures obtain the same correlations with individual level and group level outcome measures.

These results also suggest that much of the recent empirical work in the field (which uses dyadic analysis of group oriented leadership measures) may allow the drawing of (tentative) dyadic interpretations. However, it still would be clearly desirable for future researchers to use individual

oriented measures because perfect isomorphism does not exist between individual and group leadership descriptions (and because empirical similarity is not the same as theoretical similarity).

Finally, this study cannot be interpreted as indicating that general leadership behavior patterns do exist. Stereotypes, implicit leadership theories, etc., may produce similar results (Rush, Thomas, & Lord, 1977). However, it may be viewed as suggesting that the existence of these patterns should not be casually dismissed either. Thus, current research, which often seeks to prove whether or not leader behavior is individually tailored may be oversimplified and, perhaps, counterproductive. As Cummings (1975) has suggested, leader behavior may be both. Therefore, it may be worthwhile to attempt to determine what proportion of leader behavior is flexible towards different subordinates, what proportion is not, and how these behaviors differentially relate to subordinate satisfaction, performance, and other outcome variables. Similarly, if one keeps in mind that subordinate descriptions of perceived leader behavior probably are not isomorphic with objective reality, one may wish to investigate factors that affect the degree to which described leader behavior corresponds with actual leader behavior (Schriesheim & Kerr, 1977).

In summary then, this study, as well as others summarized earlier (e.g., Fleishman, 1957; Halpin, 1957a), suggests that substantial similarity exists in group oriented and individual oriented leader behavior descriptions. Perhaps this is due to the existence of general leader behavior patterns, perhaps not. In any event, this is clearly a complex issue that needs to be carefully addressed in future studies, without assuming the answer in advance.

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A Methodology to Develop the Criteria and Criteria Weightings for Assessing Subunit Effectiveness in Organizations¹

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This study offers and tests an improved procedure for measuring organizational subunit effectiveness by isolating relevant criteria and determining criteria weights within a large complex organization. The reported procedure captures effectiveness criteria and weights as utilized by managers in a manner that makes comparative analysis of organizational units possible while retaining criteria that are unique to differential goals and objectives.

Organizational effectiveness is an important topic in the study of management and organization theory. Most prior work presupposes a relationship between various organizational performance indicators and overall effectiveness. As such, the concept of organizational effectiveness has been the subject of considerable interest (Bennis, 1962; Caplow, 1964; Friedlander & Pickle, 1968; Georgopoulos & Tannenbaum, 1957; Gibson, Ivancevich, & Donnelly, 1973; Katz & Kahn, 1966; Mahoney, 1967; Mahoney & Frost, 1974; Mahoney & Weitzel, 1969; Macy & Mirvis, 1976; Mott, 1972; Negandhi and Reimann, 1973; Price, 1968, 1972; Rushing, 1974; Schein, 1970; Steers, 1975, 1977; Wahba & Shapiro, 1973; Webb, 1974; Yuchtman & Seashore, 1967).

There exists no commonly accepted definition of effectiveness. Steers (1977) notes that organization effectiveness has several different meanings based on one's frame of reference. Steers states that different organizations pursue widely divergent objectives and this uniqueness should be

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recognized in evaluation attempts. For purposes of the present research, organizational effectiveness is defined as an organization's (or unit's) *capacity* to pursue and reach its operational objectives.

Despite the quantity of effectiveness research, few good methodologies for measuring effectiveness of organizations have been produced. Steers (1975) concluded that there have been few serious attempts to explain the effectiveness construct empirically or theoretically.

EFFECTIVENESS MODELS

Attempts to measure effectiveness frequently focus on one ultimate measurement variable such as a single major performance variable, productivity, employee satisfaction, profit or rate of return, or turnover and absenteeism rates. These univariate models continue to be popular effectiveness indicators, probably due to the ease of utilization and their simplistic nature. However, the simplistic nature of these models, as well as other issues, has made them the subject of substantial criticism.

Steers (1975) criticizes the value of most univariate models because they are difficult to define, they generally reflect the researcher's biases, and they contribute very little to the understanding of the effectiveness construct. House and Rizzo (1972) criticize the use of gross end-result and/or purely economic measures, as these measures often are contaminated by factors outside the manager's influence (such as economic activity and political or governmental variations).

An equally important criticism of the univariate approach is based on the results of recent research. Several studies have found the effectiveness construct to be multidimensional in nature (Georgopoulos & Tannenbaum, 1957; Friedlander & Pickle, 1968; Mahoney & Weitzel, 1969; Mott, 1972; Webb, 1974). The results of these studies suggest that a multivariate model of effectiveness would be more relevant and useful. Multivariate models generally attempt to describe the relationship between several effectiveness variables and organizational success.

The common approach to multiple criteria effectiveness measurement is to develop general sets of effectiveness criteria relevant to all organizations. However, when Steers (1975, 1977) compared a representative sample of 17 of the multivariate models he found a general lack of consensus regarding a valid set of criteria for measuring effectiveness. He found differences in the criteria themselves, in the relationships among the criteria, and in whether the overall approach was relatively static or dynamic. Steers noted that these differences may be due to the different frames of reference from which the various authors constructed their models. The lack of consensus among multivariate models also suggests that organizational uniqueness, based on different environments, different technologies, different objectives, or other contingencies, may require different effectiveness criteria and/or different criteria weightings between organizations.

GUIDELINES FOR CRITERIA

Organizational survival and long run viability require effectiveness. The literature suggests that effectiveness is multidimensional and that measurement can be based on some set of criteria. The literature provides some guidelines for the development of these criteria. Yuchtman and Seashore (1967) state that a good system of measurement would:

1. Utilize the organization itself as the focal frame of reference.
2. Recognize the relation of the organization to its environment.
3. Provide a general theoretical framework for many different and complex organizations.
4. Provide necessary latitude for uniqueness, variability, and change.
5. Provide a guide to performance and action variables important to organizational effectiveness.

Steers (1975) also had several recommendations for the development of future effectiveness models. First, new models should be flexible and account for differences among organizations in goal preferences. Second, effectiveness models must account for the differential weights placed on the contribution of the various criteria to the effectiveness rating of an organization. Third, the model should allow for constraints that obstruct criteria maximization. Therefore the model should focus on the feasible goal set rather than on the desired set. It is important, then, that the model account for the organization's uniqueness both functionally and environmentally for assessment of effectiveness.

The Yuchtman and Seashore (1967) and Steers (1975) recommendations, together with other effectiveness literature reviewed, suggest the following guidelines for criteria development in an effectiveness measurement methodology:

1. The criteria should be based on the organization's goals and objectives.
2. The criteria should allow for comparative study of organizations and/or subunits that perform different functions and operate in different environments.
3. The criteria set should include not only productivity criteria, but other relevant criteria as well.
4. The criteria set should include both positive and negative (constraining) effectiveness criteria.
5. The method must include a procedure for determining the proper weightings (valences) of the different criteria, as well as their relationship to organizational effectiveness.
6. The method for determining criteria should be applicable at different analytical levels (e.g., total organization versus subunit level).
7. The method and resulting criteria should allow for the uniqueness of the organization and/or subunit.

One conclusion that may be reached from effectiveness literature is that many researchers feel that organizational objectives must be the frame of reference for effectiveness measurement.

All organizations have broad objectives that may be specified in formal policy statements or implied by the nature of executive decisions and other managerial activities. In order to accomplish these broad objectives it is necessary to establish operational objectives at the various subordinate hierarchical levels. Thus, assuming a consistent correspondence between the accomplishment of operational objectives and the subsequent achievement of the broader objectives, the identification of operational objectives is necessary for improvement of the effectiveness of an organization. In like manner, the identification of a set of criteria by which the achievement of the operational objectives may be evaluated is often necessary for the evaluation of organizational effectiveness (Yuchtman & Seashore, 1967).

The purpose of the present study is to test a methodology for determining the set of objective oriented effectiveness criteria and their weightings as utilized within a large complex organization. Mahoney and Frost (1974) found different effectiveness criteria predictive of the effectiveness of subunits by the technology employed. Thus the subunit level seems to provide a proper level of analysis. The following research questions define the scope of this study.

1. Will effectiveness criteria vary between subunits within a complex organization in a manner consistent with their various goals and objectives?
2. Will effectiveness criteria weightings vary between subunits within a complex organization in a manner consistent with their various goals and objectives?
3. Can complete sets of criteria, including nonproductivity measures, be developed?
4. Will the resulting sets of criteria have the potential to allow for comparative study of the subunits?

METHOD

Sample

The study was conducted at a state health department in a southwestern state. This organization was chosen because of its internal structural and functional complexity (high differentiation) and because it is a nonprofit public organization making pure productivity and rate of return measures less appropriate as single or major effectiveness criteria. The organization employed approximately 1,000 employees and had 22 major subunit departments serving 30 distinct program areas and 9 administrative functional areas.

The methodology used to determine effectiveness criteria in this study focuses on organizational objectives as determined by key organizational managers. The organization employed 50 key department and program managers who provided the sample from which data regarding effectiveness criteria were drawn.

Procedure

In the evaluation process utilized in the research, the development of criteria that would be appropriate reflections of the degree of effectiveness in achieving organizational objectives relies on the insights of those organization members who are involved in setting the objectives. It is assumed that the individuals who set objectives are in the best position to establish the observable criteria that would measure the achievement of the objectives. These individuals (managers) frequently keep the criteria concealed subjectively because they have no appropriate means for combining them into a reliable effectiveness measurement.

Slovic and Lichtenstein (1971) concluded that individuals who must make judgments (such as managerial judgments of organizational effectiveness) have a difficult time weighting and combining information relevant to those judgments. Managers must judge the effectiveness of units under their direction continuously. However, their individual judgment decision policies are not easy to identify. In fact, decision makers' descriptions of their policies many times are inaccurate (Balke, Hammond, & Meyer, 1973; Hoffman, 1960; Slovic, 1969). Also, stated policies often differ from the policies actually used in decisions. Argyris and Schön (1974) describe this as the difference between "espoused theories" of action and "theories-in-use" that actually govern behavior. They state that one cannot obtain another person's "theory in use" by simply asking for it. It must be constructed by observing and recording the person's behavior in the situation under question.

Models, therefore, can be constructed to duplicate the managers' effectiveness judgments by observing their actual effectiveness evaluations of organizations. If the presence of various effectiveness criteria can be identified in the face of given managerial judgments of organization effectiveness, certain regression analyses can be performed to establish the relationships between the criteria and the judgments.

The procedure used to provide models of managerial judgments of effectiveness in this study has been identified as "policy capturing." Policy capturing provides a method of objectively identifying actual judgment policies. The results of the policy capturing procedure are based on analysis of actual decisions and provide a quantitative description of a decision maker's policy that can be used to predict future decisions. Policy capturing is a process in which decisions and their cues (criteria) are analyzed to provide a model depicting the decision-influencing cues (criteria) and their weights. The data usually are analyzed by multiple

regression (Taylor & Wilsted, 1974). Slovic and Lichtenstein (1971) and Slovic, Fischhoff, and Lichtenstein (1977) concluded that this procedure allows judgment policies to be explicated in a precise and quantitative manner.

Policy capturing has been utilized to identify judgmental decision policies in a variety of decisions. For example, it has been used in determining judgment policies for performance appraisals (Taylor & Wilsted, 1974), for bank loan decisions (Wilsted, Hendrick, & Stewart, 1973), and decisions regarding labor-management negotiations (Balke et al., 1973). The premise is that when individuals must evaluate other things or make a decision, an underlying judgment "policy" (cognitive model) governs the way each person integrates the various pertinent items of information or variables into a single judgment. This policy can be captured by regression analysis.

Consistent with the theoretical rationale, then, the first step of the procedure involved personal interviews with key managers. They were asked to think of the organization's objectives and then to identify as many criteria variables as they could that might in any way reflect effectiveness or ineffectiveness in achieving the objectives. This method was chosen because it does not allow presupposition, without evidence, that one criterion is more important than another. In addition, it tends to elicit criteria that one manager might not identify otherwise because other managers might belittle the importance of such criteria at first glance, or might reject them because of measurement difficulties. The purpose of this step was to generate a fairly exhaustive list of all potential effectiveness criteria that might be used to evaluate effectiveness by any manager in the organization.

In this study, 25 distinct criteria possibilities were generated. They ranged from productivity indicators (e.g., the number of citizens to which service is rendered) to more subjective but important criteria (e.g., the degree of satisfaction of the recipients of the service/technical assistance). The complete list of criteria allowed representation of departmental subunit uniqueness. The items were seen by the managers as generally relevant to the organization's objectives. Table 1 provides a list of the 25 criteria with abbreviations that also are used in subsequent tables.

The next step in the procedure involved the isolation, from the list of 25 potential effectiveness criteria, of those criteria that actually were used by managers in their assessment of effectiveness, and the relative weightings of those criteria. The "policy capturing" problem was to determine how these criteria are weighted in actual managerial judgments of subunit effectiveness. This could be accomplished by having managers make decisions regarding the effectiveness of several ongoing work units for which effectiveness criteria had been identified and measured. With the ratings of effectiveness as the dependent variables and the measures of the effectiveness criteria as the independent variables, multiple regression could be used to determine which criteria had been used in the ratings, as well as the

TABLE 1
List of Effectiveness Criteria

<i>Abbreviation</i>	<i>Criteria Description</i>	<i>Abbreviation</i>	<i>Criteria Description</i>
<i>Performance Data:</i>			
(P1)	The satisfaction of the recipients of this program's service/technical assistance.	(P14)	The number of emergency situations responded to by the program.
(P2)	The rapidity with which service is rendered.	(P15)	The time and quality of the response to the emergency.
(P3)	The ability of the program staff to meet scheduled deadlines.	(P16)	The number of visits to service recipient facilities.
(P4)	The number of complaints received.	(P17)	Number of recurring problems in program's realm of responsibility.
(P5)	The amount of technical training provided the staff.	(P18)	The degree of compliance with the applicable statutes and/or regulations.
(P6)	The percentage of program employees involved in technical training.	(P19)	The program staff's problem solving abilities (technical).
(P7)	The use of good judgment by program staff.	(P20)	The program staff's administrative abilities.
(P8)	The ability to deal with operational problems.	(P20)	The program staff's ability to deal with the public.
(P9)	The program staff's efficiency in use of time.	(P22)	The number of errors found by validation efforts.
(P10)	The degree of emphasis on problem prevention.	(P23)	The quality of the reports generated by the program.
(P11)	The number of citizens to which service is rendered.	<i>Organizational Data:</i>	
(P12)	The amount of information (health and/or technical) provided to service recipients.	(O1)	Operating budget dollars.
(P13)	The amount of education provided service recipients.	(O2)	Number of regular full-time employees.

weighting factors of those criteria. The main expense of this approach would be the time it would take for the leaders to acquaint themselves with unfamiliar work units in order to make measurements of the criteria, especially since several different units would have to be evaluated by each leader.

Therefore, instead of rating actual operating units, sample subunits were "created" by ascribing measures of effectiveness criteria to simulated (cases) work units. It has been demonstrated that exactly the same results (regression equations) can be obtained using simulated cases as real conditions (Christal, 1967). The evaluation procedure, then, relies on the development of cases that duplicate the objectives and that use effectiveness criteria as they appear in the actual subunit.

Thirty simulated cases were developed. These cases consisted of a description of a simulated subunit based on the 25 criteria possibilities developed in step one. Each criterion was presented once, for each case, on a scale of one (low), two (moderately low), three (average), four (moderately high), or five (high). The level of each criterion for each of the 30 cases was chosen randomly to control for researcher bias.

The number of cases was limited to 30 for reasons of response practicality. Each case was approximately 3 pages long, thereby creating a document in excess of 90 pages. Because the effectiveness construct is very complex, the cases also were complex. It was felt that, due to the complexity and length, the respondents should not be asked to read and evaluate more than 30 cases.

Each manager was given a copy of the same 30 simulated cases, a sample copy of which is provided as Table 2. Each manager was asked to read the cases and, attending to the levels of criteria presented, to rate (judge) the effectiveness of each simulated unit in achieving objectives *assumed to be identical to the objectives of the manager's own operating unit*. The effectiveness rating was obtained on a 7-point Likert scale (1 = very

TABLE 2
Sample of Effectiveness Evaluation Sheet

The purpose of this section is to obtain your evaluation (rating) of the effectiveness of 30 simulated State Department of Health Work programs. Various information that might be useful to you in your determination of each program's effectiveness is presented to assist in your evaluation. It is expected that an "effective" program will be considerably different from an "ineffective" program in terms of the information presented. The programs presented here were selected because the information among them varies widely from case to case, which makes it likely that a good spread of effective, partially effective, and ineffective programs have been included.

Instructions. Assume that a management audit has been performed on each of 30 programs concerning the work activities of the past 12 months. The data collected is in the form of five-point scales (from low to high) which are marked by the auditor to reflect his analysis of each separate activity (factor). Please read each audit report, considering the information presented on the particular program. Then record your evaluation of that program's effectiveness on the seven-point evaluation scale following the report. There are 30 programs so do not spend a great amount of time on any one, but do "consider" all the information before recording your judgment. Please make use of the entire scale.

Example. If you felt one program depicted was particularly *ineffective*, you might place an X in the left most blank, thusly:

very
ineffective X : : : : : : very
 1 2 3 4 5 6 7 effective

If you felt another program was especially effective, you might place an X in the right most blank, thusly:

very
ineffective : : : : : : X very
 1 2 3 4 5 6 7 effective

and so on. Programs that were of average effectiveness might be rated in one of the more central blanks.

GENERAL INFORMATION ON THE SIMULATED PROGRAMS

To assist you in rating the effectiveness of the simulated programs you should assume the following:

- (1) Each program reported has essentially identical program objectives, clients, environmental issues, etc., to the other programs.
- (2) Since the audit reports only contain data on *how well* the program performed various activities (not what the activities were), you should assume each program performs activities very similar to the activities performed in the State Health Department program which you supervise.
- (3) Please recall that the information given in the simulated audit reports is in the form of low, moderately low, etc. You should have previously defined these points for those criteria which are quantifiable.

ineffective, 7 = very effective). Hence, using the levels of the criteria presented to the managers as the independent variables and the resulting effectiveness rating by the managers as the dependent variable, regression analyses could be performed to reveal the managers' effectiveness judgment models (theory-in-use).

RESULTS

Criteria Independence

Dudycha and Naylor (1966) have demonstrated that interrelationships among cues (criteria levels here) as shown by a Cue R matrix, may affect raters' judgments. In the present study, the random assignment of criteria levels in the 30 cases should have maintained the desired criteria independence. An intercorrelation matrix was constructed to test criteria independence. The matrix shows the bivariate correlations for each of the pairings of the 25 criteria over the 30 cases ($n = 30$).

As shown in Table 3, the highest r between any pair of criteria was .615 and therefore the highest common variance was .378. Furthermore, 96 percent of the pairwise r 's were below .4 and 85 percent were below .3. Therefore, the criteria were highly independent and free of collinearity. The low intercorrelation among the criteria (cues) should have allowed the development of more accurate effectiveness judgment models, free of multicollinearity among the predictors.

Dudycha and Naylor (1966) also found that the multiple correlation coefficient (R^2) of regression models may decline as cue intercorrelation decreases. However, examination of individual effectiveness judgment models, described later in Step 1 of the analysis, shows that manager-rater R^2 's were as high as .985. The resulting large number of high R^2 's suggests that the effect found by Dudycha and Naylor (1966) was not present in this sample.

Policy Capturing

The data were first standardized by obtaining the Z score for individual manager's effectiveness ratings. The data then were analyzed using stepwise multiple regression analysis. Although there are other possible means of analysis, Slovic and Lichtenstein (1971) found that the linear model does a remarkably good job of predicting human judgments. Each individual completed the effectiveness rating for 30 simulated cases. Thus the sample size was 30 for each individual. A total of 47 managers returned completed effectiveness ratings of the simulated subunits. The total number of data observations therefore was 1,410.

However, because each manager received identical sets of the same 30 cases, all 1,410 observations may not be independent. As explained earlier, each manager was instructed to evaluate each case as if the described unit

had objectives and activities similar to the actual unit being supervised. This instruction should create independence *between* the 47 supervisors but we cannot be sure of independence *within* each supervisor's ratings of the 30 cases. Therefore, the actual number of *independent* observations lies somewhere between 47 and 1,410. There is a precedence for using the 1,410 observations as the sample (Stewart & Gelberd, 1972).

Step 1: The first step in the data analysis involved developing effectiveness judgment models of the effectiveness criteria used by each of the managers in his/her rating of the simulated units' effectiveness. This step served as a quality check on the managerial ratings. Marking the effectiveness ratings of all 30 cases (each case having 25 criteria at various levels) required several hours on the part of each manager. Stepwise regression analysis yielded R^2 's of individual manager effectiveness judgment models ranging from $R^2 = .985$ to $R^2 = .09$.

The sample size for each manager was only 30 with 25 criteria as potential variables in the regression. Therefore, stepwise regression was used to lessen possible problems with the limited degrees of freedom. This procedure entered only those criteria variables that were statistically significant at $p < .05$. The most complex individual effectiveness judgment model that resulted contained 11 independent criteria variables. However, the mean number of independent criteria variables over all judgment models was only four, indicating that the stepwise procedure was effective for dealing with the limited observations.

It had been assumed, *a priori*, that an individual model $R^2 < .4$ would indicate an inconsistent managerial rating of the 30 cases. Nine individual models failed to meet this minimum requirement, and the data from these nine managers were not included in subsequent analyses. This reduced usable sample size to 38 managers, and 1,140 observations.

Step 2: The second step in the data analysis required the development of effectiveness judgment models that might apply more broadly for the major groups in the organization. The first model was for the total organization. Data from all 38 managers (1,140 observations) were used to develop this model. The stepwise regression procedure found that no independent criterion variable was significant at $p < .05$. Although the individual data were consistent, there seemed to be differences between departments and individuals, making it impossible to develop a general effectiveness judgment model of effectiveness criteria for the total organization. This result lends partial insight to questions 1 and 2 posed in this study. Effectiveness criteria were not found to apply in a consistent manner for the total organization. Therefore, one may assume that effectiveness criteria would be unique to some smaller organizational subunit, consistent with operational objectives of that subunit.

To assure that differences exist between major units in the organization, ANOVA was utilized to determine whether the rankings of effectiveness used as the dependent variable in the regression model differed among the major divisions in the organization. The major divisions (PHS division,

EHS division, A division) were utilized at this point because they made up the bulk of the remaining managers ($n = 33$). The one-way analysis of variance was conducted on both the raw data and the standardized data to ensure that no artificiality was created by standardization. The results of this analysis are shown in Table 4. The results showed that statistically significant differences existed between the mean effectiveness ratings (on both raw and standardized data) in the three major divisions in the organization. This result supports the notion that the effectiveness construct may be operational in some smaller organizational unit.

TABLE 4
ANOVA for Effectiveness Ratings
Across Major Divisions

Data	Means			F Ratio (df. 2,987)
	PHS $n=300$	EHS $n=420$	A $n=270$	
Raw data	3.55	3.86	3.43	11.523**
Standardized data (z score)	-.11	.33	-.13	18.99**

** $p < .01$

Therefore, effectiveness judgment models were developed for the three major divisions within the state health department. The PHS Division, EHS Division, and the A Division were the largest and involved several managerial positions. The LHS, DF, and HFS divisions were smaller with only one or two managers and, therefore, were not analyzed at this point. The stepwise regression procedure again was utilized to develop the three models. Data from all usable managerial observations, within each of the three divisions, were included in the regression procedure. In the PHS division there were 10 managers and 300 observations; in the EHS division there were 14 managers and 420 observations; and within the A division there were 9 managers and 270 observations of managerial effectiveness judgments.

Table 5 presents the results of these models. As shown in Table 5, several effectiveness criteria were found to predict major unit effectiveness. However, each of the models has a low R^2 reflecting a low explanation of the variance of the dependent variable (effectiveness) in each of the models. This result seems to indicate differences between managerial effectiveness judgments even within major organizational divisions.

To determine if significant differences exist between managers' effectiveness ratings within each of the major divisions, ANOVA was utilized. The results of this analysis are presented in Table 6. The results show statistically significant differences between the managers' effectiveness ratings (on both raw and standardized data) within each of the three divisions. This may be because of operational goal differences between the

TABLE 5
Regression Models of Significant Effectiveness
Criteria for Major Divisions of the Organization

<i>PHS n=300</i>		<i>EHS n=420</i>		<i>A n=270</i>	
<i>EC^a</i>	<i>SRC^b</i>	<i>EC^a</i>	<i>SRC^b</i>	<i>EC^a</i>	<i>SRC^b</i>
P1	.28**	P1	.25**	P1	.42**
P9	.32**	P21	.19**	P8	.23**
P4	.24**	P4	.19**	P9	.17**
P21	.16**	P9	.16**	P5	-.16**
P7	.17**	P7	.19**		
P19	.11*	P23	.11*		
<i>F=20.71**</i>		<i>F=19.37**</i>		<i>F=19.02**</i>	
<i>d.f.=6,293</i>		<i>d.f.=6,407</i>		<i>d.f.=4,264</i>	
<i>R² = .298</i>		<i>R² = .222</i>		<i>R² = .324</i>	

^aEffectiveness criteria.

^bStandardized regression coefficients.

**p* < .05

***p* < .01

TABLE 6
ANOVA for Effectiveness Ratings
Across Managers Within Each Major Division

<i>Division</i>	<i>F Ratios</i>	
	<i>Raw Data</i>	<i>Standardized Data</i>
PHS	3.26** (d.f. 9,290)	4.32** (d.f. 9,290)
EHS	9.26** (d.f. 13,406)	17.57** (d.f. 13,406)
A	4.84** (d.f. 8,261)	7.93** (d.f. 8,261)

***p* < .01

subunits within the larger divisions, and therefore, indicative that the lowest subunit (department manager) is the appropriate level of analysis.

Step 3: The results of the previous analyses indicate that (1) there are large differences between managers' judgment policies regarding effectiveness criteria within this complex organization and (2) the subunit level of analysis may be the most appropriate for development of relevant effectiveness criteria.

The purpose of step 3, then, was to examine the effectiveness judgment models for the 22 key department managers throughout the organization. Table 7 presents the results of these models. However, there is a disadvantage in using individual models in this sample. This disadvantage again pertains to the degree of freedom problem, because each individual model is developed from 30 observations with 25 potential independent criteria variables. Stepwise regression again was used, as explained in step 1, to deal with the analysis of limited observations. Using a significance level

TABLE
Department Manager's Regression Models

<i>PHL^a</i>		<i>DS</i>		<i>MCHS</i>		<i>EH</i>		<i>TRD</i>		<i>VDC</i>	
<i>EC^b</i>	<i>SRC^c</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>
P22	-.574**	P11	.568**	P1	.772**	O2	-.915**	P12	.426**	P15	.508**
P9	.295*	P21	.390**	P9	.254**	P1	.249**	O2	-.389**	P11	.502**
P1	.282*	P10	.338**	P15	.330**	P11	.225**	P14	.316**	P12	-.324*
				P7	.269**	P8	.135*	P4	-.413**		
						P21	.126*	P5	-.331**		
								P22	-.263**		
								P19	.281**		
								P9	.198*		
<i>F</i> = 14.65**		<i>F</i> = 13.84**		<i>F</i> = 35.67**		<i>F</i> = 43.16**		<i>F</i> = 9.27**		<i>F</i> = 8.93**	
d.f. = 3,26		d.f. = 3,26		d.f. = 4,25		d.f. = 5,24		d.f. = 8,21		d.f. = 3,26	
adj <i>R</i> ² = .585		adj <i>R</i> ² = .571		adj <i>R</i> ² = .827		adj <i>R</i> ² = .879		adj <i>R</i> ² = .695		adj <i>R</i> ² = .451	
<i>CS</i>		<i>PI</i>		<i>PHSS</i>		<i>DP</i>		<i>VR</i>		<i>PS</i>	
<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>	<i>EC</i>	<i>SRC</i>
P23	-.613**	P8	.210*	P5	-.559**	P1	.714**	P18	.262**	P18	.809**
P3	-.234*	P3	-.570**	P19	.447**	P15	.382**	P14	.348**	P22	-.290**
P1	.429**	P23	.366**	P9	.403**	P11	.250**	P17	-.472**		
P21	.441**	P14	.303**	P4	.266*			P9	.496**		
P6	.242*	P19	.429**	P13	-.318*			P8	.517**		
		P9	.328**	P1	.251*			P2	.298**		
		P5	-.212**					P11	-.276**		
<i>F</i> = 19.77**		<i>F</i> = 15.60**		<i>F</i> = 6.03**		<i>F</i> = 8.66**		<i>F</i> = 13.64**		<i>F</i> = 43.75**	
d.f. = 5,24		d.f. = 7,22		d.f. = 6,23		d.f. = 3,26		d.f. = 7,22		d.f. = 2,27	
adj <i>R</i> ² = .764		adj <i>R</i> ² = .779		adj <i>R</i> ² = .510		adj <i>R</i> ² = .442		adj <i>R</i> ² = .753		adj <i>R</i> ² = .747	

^a*n* = 30 in each department manager's regression model.

^bEffectiveness criteria.

^cStandardized regression coefficients.

**p* < .05

***p* < .01

p < .05 for entering into the analysis, the largest number of criteria variables entered into any model was 10, and the average number included was 5.

Each of the resulting effectiveness judgment models, as shown in Table 7, was significant at *p* < .01. The adjusted *R*² for each model also is reported in Table 7. The adjusted *R*² is an *R*² statistic that is adjusted according to the number of independent variables in a regression equation, and as to the number of observations. The adjusted *R*² is a more conservative estimate of the percent of total variance explained by the model and is useful for examining models based on small sample sizes (Nie, Hull, Jenkins, Steinbrenner, & Bent, 1975).

As shown in Table 7, the models seem fairly consistent internally, with reasonably high *R*². It is noted that there is considerable difference between the models by department, both in terms of the important effectiveness criteria and in terms of their weightings. This result adds to the understanding of research questions 1 and 2. It can be seen that both the criteria and criteria weightings also vary between subunits, and that the

7

(Judgment Policies) for Effectiveness Criteria

WQS		AQS		ORHS		CPS		FS	
EC	SRC	EC	SRC	EC	SRC	EC	SRC	EC	SRC
P23	.703**	P8	.426**	P18	.531**	P1	.288*	P1	.762**
P12	.294**	P9	.492**	P1	.311**	O2	.213*	P14	-.336**
P22	-.379**	P19	.419**			P9	.253**	P17	.271*
P7	.448**	P5	.277*			P23	.399**	P8	.259*
P15	.261*	P7	.255*			P17	-.549**		
						P7	.337**		
						P21	.248**		
						P12	.245**		
						P2	.253**		
						P13	.192*		
$F = 14.65^{**}$		$F = 9.17^{**}$		$F = 15.11^{**}$		$F = 18.35^{**}$		$F = 14.71^{**}$	
d.f. = 4,25		d.f. = 5,24		d.f. = 2,27		d.f. = 10,19		d.f. = 4,25	
adj $R^2 = .701$		adj $R^2 = .585$		adj $R^2 = .493$		adj $R^2 = .857$		adj $R^2 = .654$	

M		ADM		DS		LHS		I	
EC	SRC	EC	SRC	EC	SRC	EC	SRC	EC	SRC
P7	.389**	P22	-.670**	P1	.623**	P7	.563**	P11	.642**
P19	.441**	P23	.315**	P15	.376**	P9	.447**	P9	.578**
P9	.285**	P9	.320**	O1	-.350**	P19	.518**	P6	.305**
P4	-.363**	P12	-.214*	P12	.249*	P20	.366**	P8	.170*
P1	.284**	P15	-.213*			P18	.222**	P19	.166*
P18	.205*					P21	.200**		
P12	.167*					P5	.165*		
$F = 26.38^{**}$		$F = 9.68^{**}$		$F = 9.01^{**}$		$F = 39.65^{**}$		$F = 17.60$	
d.f. = 7,22		d.f. = 5,24		d.f. = 4,25		d.f. = 7,22		d.f. = 5,24	
adj $R^2 = .860$		adj $R^2 = .599$		adj $R^2 = .525$		adj $R^2 = .903$		adj $R^2 = .741$	

amount of variance explained in the effectiveness rating is much higher by combining criteria at the subunit level.

DISCUSSION

The purpose of this study was to test a methodology for determining a set of effectiveness criteria and their relative weightings as utilized by managers for measuring effectiveness within a large complex organization. Four research questions defined the scope of the study.

Research questions 1 and 2 pertained to the relationships among criteria, criteria weightings, and the goals and objectives of organizational subunits. The results of the analysis indicated substantial differences between subunits with respect to both criteria and criteria weightings for measuring effectiveness. As found by past researchers, the differences in these models could be reflective of individual differences as well as differences between subunits. Therefore, it was important to determine if the effectiveness judgment models were reflective of differences in the goals

and objectives of the subunits. All managers and the agency director were interviewed to obtain their judgment as to the goals and objectives of the subunits. Almost all managers indicated that the model generated for their unit coincided with the program objectives and contained relevant effectiveness criteria. The agency director indicated that the various subunit effectiveness judgment models corresponded well with his assessment of actual differences among missions pertaining to each of the subunits. He felt that only two of the models had minor deviations from subunits' goals and objectives. It should be noted that these were informal interviews conducted by researchers interested in expressions of face validity and, as such, they offer only weak evidence as to the relevance of effectiveness criteria. Still, the interviews suggest that the effectiveness judgment models (final criteria sets and weightings) have face validity to key organizational members.

Research question 3 concerned the development of complete criteria sets including both productivity and nonproductivity measures. A potential list of 25 criteria was developed, of which the maximum number used for any single subunit was 10. One criterion (P_{16}) was not used in any model, and a number of others applied only to one subunit. This finding suggests that the generated list of potential criteria was fairly complete. Furthermore, the criteria actually used included both productivity and nonproductivity measures.

The final research question relates to the potential for comparative study between subunits. Unless an effectiveness measurement procedure allows for comparative study of subunits, the measurement is severely limited for both research and organizational purposes.

The data from these analyses may be used for two purposes. First, they may be used comparatively to show differences and/or similarities that exist among subunits. Second, these models may be useful for establishment of actual effectiveness ratings of the subunits. In such case, actual ratings of the subunits on each of the criteria from the subunit manager's model could be obtained. The criteria ratings may be made by one or more of the following parties—superiors, subordinates, or clients. The rating scores may be placed back into the manager's regression model and a final subunit effectiveness score obtained. These scores may be useful for a variety of organizational and research purposes. The only factor, other than real effectiveness differences, that will affect the comparability of effectiveness scores is the possibility of supervisory bias.

Two types of supervisory bias are involved in any effectiveness rating system. First is the self-interest inflation tendency whereby a supervisor knowingly would rate his own unit as more effective than pertinent criteria would indicate the unit actually to be. Because the outlined procedure does not ask the supervisor to rate his own unit, this bias does not enter into the comparability of effectiveness scores among units.

Second, there may be a general "leniency" tendency whereby a supervisor may rate all units as more or less effective than they truly are. In the

study this bias was controlled by standardizing all supervisor ratings of the simulated cases. The results of an effectiveness study such as this may be utilized in various ways, but two practical uses are immediately apparent. First, if the criteria are shown to relate to desired subunit goals, effectiveness ratings can be obtained at various points in time by collecting data on each criterion and combining the data according to the model. Second, it is possible that the models deviate from the desired goals. This would mean that the unit manager is stressing activities that are either dysfunctional or not helpful to the unit's mission. In such case the manager can take action to correct his activities. The top executive of the organization studied here had felt that two models were inappropriate. As a result of meeting with the involved unit managers, corrective action was planned.

The methodology for determining the effectiveness criteria used by managers described in this study accounts for uniquenesses of organizational subunits under study and provides, therefore, a contingency approach to effectiveness criteria development. The methodology allows comparative study of subunits, which is a significant improvement over current systems of measurement. Furthermore, many units such as research departments and service departments that "generate" no profit and that may not have "measurable" productivity can be included in comparative studies. Comparative study is essential for establishing causal relationships and understanding the relationship of many organizational factors to effectiveness. This procedure may be useful for a variety of research and organizational purposes.

The results of this study also support earlier findings that suggest that appropriate effectiveness models are multivariate in nature. The results specifically support Steers' (1975, 1977) contentions that the multivariate model must allow for potentially different criteria for different organizations or units.

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Interorganizational Dependence and Responsiveness to Affirmative Action: The Case of Women and Defense Contractors¹

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This study is an examination of the effect of interorganizational dependencies on compliance with government affirmative action demands. Defense contractors were the subjects in the study. The speed and affirmative action displayed by their replies were statistically related to an interaction of (1) the firm's proportion of sales to the government, (2) the proportion of a government procurement supplied by the firm, and (3) the magnitude of the firm's nondefense sales. More affirmative actions were apparent for consumer product firms, which had the least power in their exchanges with the government.

Many theories propose that interorganizational influence derives from the dependence of organizations upon one another, including those of Blau (1964), Emerson (1962), Hall (1972), Hickson, Hinings, Lee, Scheck, and Pennings (1971), Jacobs (1974), Thompson (1967), and White (1974). Despite this sizable background, few empirical analyses have examined whether organizations with interdependencies influence one another. The present paper describes one such analysis, an examination of government contractors' affirmative actions in attracting women into management positions.

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Interorganizational influence is important for what it may reveal about how an organization's environment affects the organization. One very direct way is that individuals, groups, or organizations make explicit demands for behavior. A clear example is the way employees, through their unions or other collective structures, demand particular wage benefit packages or working conditions.

Many similar or contrary demands are made by different groups (Friedlander & Pickle, 1968). An important question thus is, "With which interest groups do organizations comply?" The notion of interorganizational dependence suggests an answer. The open-systems model of organizations (Katz & Kahn, 1966) implies that organizations depend upon one another for their survival and as a consequence influence one another in their own interests. As the viewpoints of Thompson (1967), March and Simon (1958), and Cyert and March (1963) suggest, an organization's central problem is managing a coalition of support sufficient to continue its existence. In solving that basic problem, organizations are open to influence from one another (Jacobs, 1974; Yuchtman & Seashore, 1967; Benson, 1975). From this perspective it would seem that an organization will comply with the demands of interest groups in accordance with its dependence on them. Failure to comply with the demands of an important interest group may lose an organization the support of the group and disable its continuing operations.

Surprisingly, there have been few empirical studies of organizations influencing one another because of their interdependencies. Most material is anecdotal, and only a few comparative analyses have been made. Randall (1973), for instance, found that state employment agencies attended to the demands of large employers more than small employers, consistent with their presumed dependencies. More recently, Pfeffer and Leong (1977) analyzed United Funds in cities throughout the United States and found that allocations were related to a Fund's dependency on member agencies. In these studies, however, either the demands or the interdependencies of the involved organizations were not explicitly analyzed. A more explicit study of Pfeffer (1972) analyzed Israeli managers' reactions to hypothetical investments favored by the Israeli Ministry of Trade and Industry. The managers were willing to accept lower returns from government recommended investments when they needed the Israeli government for sales or financing.

The Pfeffer (1972) study offers perhaps the best evidence for the hypothesis that organizational actions are related to their dependencies, because it examines reactions of executives to specific government requests and finds that responses vary with resource dependencies. However, Pfeffer's analysis was of hypothetical behaviors, which in the particular situation could be a shortcoming. The interviewer presenting the hypothetical investments to Israeli firms was a well-known government advisor, whom the executives may have tried to impress with their support, albeit noncommittal, for governmental programs.

The present study was undertaken to gather additional evidence about the role of interorganizational dependencies on responses to explicit demands. Two goals guided this attempt. The first was to observe how organizations' actual behaviors are affected by dependencies. The second was to specify more carefully the relationship between organizational interdependencies and interorganizational influences. The first goal will be considered when the context and procedures of the present study are described. The second is discussed next.

Much of the theoretical literature, and the few empirical studies, on organizational influence has proceeded from a very one-sided perspective, from the perspective of how one organization's dependence opens it to influence from the other. Such a perspective overlooks the interactive nature of influence and compliance. One unemphasized possibility is that dependence goes both ways, with each organization depending on the other. Yet, this would seem to be an important consideration when examining how one organization might influence another. An organization that depends on the organization it is trying to influence may be less demanding than one which does not have this dependence. And the organization targeted for influence might bargain to avoid compliance with an organization dependent upon it. Thus, the present study examines how the dependencies of both the targeted organization and the influencing organization affect the former's compliance with the latter's demands. Pfeffer (1972) reported some data consistent with this possibility. He noted that firms from more concentrated industries were less influenced by their dependencies on the government. Quite possibly this was because these firms were in a position of some power in supplying the government. The government had to depend on only a few major suppliers in concentrated industries, but in the less concentrated industries it could select from numerous small suppliers.

A second problem of focusing on only the targeted organization in a study of interorganizational influence is that one overlooks the possibility that an influencing organization does not press for compliance evenly across targets. Because an organization attempting to influence other organizations may not have sufficient resources to pursue or enforce demands equally among the other organizations, it may select certain targets, much as the Internal Revenue Service selects certain taxpayers as targets for scrupulous audits or prosecution. Given limited resources, an organization may select targets that are highly visible and can serve as examples or that show promise of leading to successful influence. It is naive to expect equal pressure for influence across a set of organizations. Thus the present study is an examination of how the potential visibility of targeted organizations relates to their compliance with demands.

THE STUDY

The discussion above can be summarized in the form of a hypothetical model about interorganizational influence, namely:



$$\text{Model I: } R_{ab} = PD_{ba} \times (D_{ab}/D_{ba})$$

which asserts that the responsiveness of organization *a* to demands from organization *b*, (R_{ab}), is an interactive function of the extent to which organization *b* pressures organization *a* with a demand, (PD_{ba}), and the relative dependencies of each organization upon the other, that is, the dependence of *a* upon *b* relative to the dependence of *b* upon *a*, (D_{ab}/D_{ba}). By one organization *pressuring* another with a demand is meant the extent to which the influencing organization actually makes a demand upon a target organization. This pressure involves the explicitness of the demand, the communication of the demand, and the enforcement of the demand. In the present study it is assumed that such pressure will be reflected in the visibility of the targeted organizations to the influencing organization and its constituents—that is, that an influencing organization is more likely to explicate, communicate, and enforce its demands upon organizations that are highly visible targets for social change. By *dependence* is meant the extent to which one organization must obtain a needed resource from another organization. Involved here is the criticality of the resource to the organization and its availability from alternative sources. This definition of dependence is common to theories of social exchange (Blau, 1964; Emerson, 1962). The present study is concerned with organizations that depend upon one another for input and output resource exchanges. Thus, target organizations are assumed to be dependent to the extent that they obtain sales from an influencing organization relative to other sources. The influencing organization is dependent upon the target organization to the extent that it obtains supplies from it relative to other sources.

The reason for assuming an interaction between organizational dependencies and the extent to which an organization is pressured with a demand is simply that when an organization is not so pressured, when demands are not explicitly communicated or enforcement is not anticipated, then one should expect little compliance regardless of the dependencies on an influencing organization. And when demands are present, compliance should be a function of the relative dependence of each organization upon the other, since asymmetries in dependence determine the potential power of one organization over another.

This interactive model of interorganizational influence can be distinguished from other models of responsiveness to demands. Thus, for example, another model might assert that responsiveness is a simple function of the dependence of one organization upon the other ($R_{ab} = D_{ab}$). Or one might argue that responsiveness is a function of the pressure for compliance ($R_{ab} = PD_{ab}$). In the analysis below the hypothesized interactive model is evaluated relative to these and several other alternative models.

The context of the present study is the responsiveness of U.S. defense contractors to recent governmental and social demands for equal opportunity hiring of women. The context is used for a number of reasons. First, the organizations are among the major industrial firms of the United

States, representing a considerable portion of U.S. industrial activity and hiring. Second, the dependency of firms and the government is assessed easily, because the U.S. government is the major outlet for defense production and transactions become public records. Third, the primary pressures for affirmative action in hiring women are attributable to the U.S. government. Although a number of groups and individuals demand hiring of women and minorities, the government remains the major enforcement agent, having the legal responsibility. As such, the social pressures from other groups (e.g., unions, special interest groups) would be channeled or represented through the government.

The data for this study were collected at the end of 1972 and the beginning of 1973, a time when the U.S. government had just begun to campaign aggressively for increased representation of minorities and women in U.S. organizations. Although the Civil Rights Act of 1964 established the Equal Employment Opportunity Commission (EEOC) and President Lyndon Johnson issued an executive order in 1965 requiring "affirmative action" by contractors, it was not until 1970 that a meaning was given to affirmative action. Labor Secretary George Shultz at that time wrote Executive Order No. 4. This order required government contractors to file detailed statements about currently employed minorities. The order, revised in December 1971 to include women, specified that goals were to be set for increased hiring when there were fewer minority or women employees than "reasonably expected by . . . availability." Even with this clarification and the surveillance on organizational behavior, the enforcement program did not acquire teeth until 1972. Then the EEOC was given the power to bring lawsuits against reluctant employers. By 1973 aggressive affirmative action was a realistic demand upon organizations.

The context of affirmative action is useful for examining interorganizational influence because of some particular historical features. In 1972-1973, affirmative action was not a favored policy in the United States, as suggested by the fact that it took eight years to become enforceable. Indeed, the enforcement apparatus for this policy has lingered even to the present. One reason for the slow pace may be limited enforcement pressure from the government because of its own limited funds. Such limited funds and the relative disfavor of the affirmative action policy might lead the enforcement of this policy to be quite selective. This possibility provides an excellent opportunity for examining the model of interorganizational influence hypothesized here, which asserts that response to demands is a function of the pressures for compliance interacting with interorganizational dependencies. Thus, in the context of the U.S. experience with affirmative action, one would expect some organizations to be more subject to pressure than others. In the present analysis, it is assumed that the pressures might fall more heavily on large visible consumer product corporations. The reason is simply that these corporations affect numerous individuals as consumers and employees and receive more

news coverage. They are more visible, and support can be rallied more easily against them on issues such as equal opportunity.

Studying the affirmative actions of defense contractors permits an examination of the actual behavior of organizations. The affirmative actions that an organization makes in attracting minorities and women are available to public inspection. The racial and/or sexual composition of the employees of most organizations is not. (This statement is not quite true. Theoretically, records of employees' demographics are available under the Freedom of Information Act. However, it is a contested theory, and a number of firms are reluctant to have the government release such information. As an example, the Council of Economic Priorities [CEP] [1974] recently asked 43 firms to supply information on the percentage of women and minorities employed in various classes of positions. Fourteen of the 43 responded with satisfactorily complete information. The information was available to the organizations, as they are required to file it with the Equal Employment Opportunity Commission. The 32% responding is one measure of the amount of voluntary disclosure one can expect on potentially sensitive organizational behavior.) If organizations are in fact attempting to attract women into management positions, they have to do so through publicly communicated actions. Thus they have to make special efforts to advertise to women. Or they have to develop special procedures for handling women job applicants, such as providing an "affirmative action officer" or an "equal opportunity employment" office. Such behaviors are public or can be made to be public and reflect the responses of organizations to demands for affirmative action.

In summary, an examination of the affirmative actions of U.S. defense contractors offers a useful opportunity to evaluate the argument that interorganizational influence is an interactive function of the pressures for compliance and the interorganizational dependencies between organizations, as specified by the general model guiding this research (Model I).

As a more specific empirical hypothesis for this context, it is expected that *highly visible organizations will be subjected to greater pressures to take affirmative actions in hiring women into management positions and will respond to such pressures as a function of their dependencies on the government for sales relative to the government's dependencies on them for supplies.*

METHODS AND PROCEDURES

Data were collected on U.S. defense contractors' (1) sales to the government for defense products and services, (2) sales for nondefense goods and services, (3) market share of procurements for the defense products the firms supplied, and (4) responses to a third-party inquiry about job opportunities for women in management.

In order to develop the dependent measure of responsiveness to affirmative action demands for the present study, use was made of a method of

stimulating outcroppings of organizational behaviors. Stimulating means that the investigator presents to an organization a situation, decision, or problem relevant to the behavior of interest and then observes how the organization responds. The notion of outcropping is from geology. It refers to the finding of rocks that jut from the earth's surface but serve as useful indicators of what lies beneath. The notion of stimulating outcroppings is used to suggest that the investigator takes an active part in bringing things to the surface without disturbing what lies beneath. Surveys of course stimulate responses, but they frequently do so by creating them or contaminating them (Webb, Campbell, Schwartz, & Sechrest, 1966). The strategy is for the investigator to present a legitimate situation to an organization and observe its response, much as is done in laboratory experiments.

Defense contractors were asked about job opportunities for women Master of Business Administration candidates through an inquiry by a business school. The replies are assumed to reflect their responsiveness to hiring women into management, as outcropping of the firms' affirmative actions. The inquiry presents an opportunity to the organizations to attract women candidates for positions in management. How the firms use this opportunity reflects their affirmative action in hiring women managers. A particularly affirmative organization might respond by telephone, seeking names and details immediately, or might send special catalogs entitled "Opportunities for Women in Management." Or a firm might not respond at all, thus giving up an opportunity to attract women MBAs.

Letters were written to the top 100 U.S. defense contractors of 1968-1970, those selling most to the Department of Defense. The years selected were those closest to 1973 for which complete data were available. Any changes in the activities of the companies from 1970 to 1972 are likely to be slight because defense contracting positions are quite stable (Hunt & Hunt, 1971).

For each firm the executive vice president or the president was sent a letter on stationery from a university. The letters were signed above the title "MBA Faculty Advisor" and stated that the writer was assigned to advise MBAs about job opportunities. As part of that responsibility the writer was inquiring about the firm's opportunities for women graduates. The letter indicated that there had been an increase in the number of qualified women in management programs but that advising them was often difficult and unrealistic because opportunities for women were not publicized. The letter asked firms to describe their opportunities for women and to send career information and brochures. The letters addressed senior officers so they could relay the letter to appropriate individuals.

Letters were mailed over a period of two months. Each firm was allowed one month to reply. Records were kept on the mailing and return postmarks. All mailings went through the central routing postal station in

Chicago, a point from which delivery takes one day to any major city in the United States.

Sample

From the top 100 contractors, a final sample of 78 firms was drawn. Holding companies were excluded because they did little or no hiring. Such firms hire clerks for their own small offices only, but not for the operating corporations they control. Other firms were dropped because they replied they did not hire new graduates or MBAs, or they anticipated no hirings in the current year. Engineering or research and development firms were dropped because they rarely, or never, hired individuals who had only an MBA, preferring an engineering or science degree. Still other firms were excluded because information about sales or products could not be obtained from public records. On the other hand, no firm was dropped if it did not reply to the letter of inquiry.

For the sample firms, total sales were obtained from *Fortune* 500 listings. Sales for defense contracting were obtained from a report by the Council of Economic Priorities (1972a), gleaned from Department of Defense (DOD) publications. Defense publications were used to check CEP's figures. Defense publications included *100 Largest Defense Contractors and Their Subsidiary Companies* and *500 Contractors Listed According to Net Value of Military Prime Contract Awards for Research and Development, Test Evaluation Work*, available yearly from DOD.

Firm Classification

The argument in this study suggested that greater pressures for affirmative action would be placed on some firms than on others. Such firms were assumed to be large, visible consumer product firms and to be identified from the data available on the nondefense sales of contractors. Although all the firms in the sample are large, with total sales ranging from a few billion down to the tens of millions, for study purposes large visible firms were defined as those in the top third in nondefense sales. Nondefense sales were assumed to reflect the firms' visibility to the public rather than their size, as would be reflected in total sales. Such firms tend to be consumer product firms such as General Electric and General Motors. (To avoid liabilities, the firms named in this report for illustration are not necessarily among the studied sample.)

Government Dependence

The firm's concentration within the category of products it supplies the government was used to estimate the government's dependence on contractors. This is a measure advocated by a number of theorists (Mindlin & Aldrich, 1975; Jacobs, 1974) as an explicit operationalization of organiza-

tional dependence. The government depends upon its contractors because the items it purchases are believed vital to the national defense (missiles, nuclear warheads) and in some cases are not readily available from numerous suppliers.

The Council of Economic Priorities report (1972a) classified firms into defense product categories such as missiles, shipbuilding, or automotive. These classifications were derived from DOD's categories. The government's dependence on a firm for a particular good or service then was measured by the proportion of 1970 procurements in that category supplied by the firm. For example, in 1970 Colt Industries accounted for over 50 percent of the small arms business to the government, which indicates the extent of the government's dependence on it as a contractor.

Firm Dependence

Contractors' dependencies were estimated in a manner similar to that for government dependence, that is, as the proportion of the firms' total sales made to the government in 1970. The range across the 78 firms was from under 1 percent to over 80 percent.

Responsiveness

Two measures of responsiveness to affirmative action demands were derived from replies to the inquiry. One is the length of time it took the firm to respond, a relatively convenient measure of the number of days from the mailing of the inquiry to the postmark of a return. Firms not responding were coded "30 days," or the maximum time allowed for a reply. This coding truncates the response scale for 19 firms that did not respond within the allotted time and that had not responded by the time of the writing of this report. Because they probably never will respond, their score would be infinity unless truncated. Response time as a measure of affirmative action assumes that firms with a more active interest in attracting women would have had facilities for dealing with inquiries, such as an affirmative action office and/or materials emphasizing employment for women.

The second measure of responsiveness was derived from coding the content of replies. Firms received 1 point for a short note or penciled reply on the original letter, 2 points for a letter, and 3 points for a letter plus brochure or material about job opportunities. In addition, firms were given 1 point if they replied through an affirmative action director or a specific subunit devoted to equal employment hiring. Firms also received an additional 2 points if the brochure pictured women in managerial roles (e.g., directing a seminar meeting) and 1 point if they pictured women in any kind of role. If only men were pictured, no additional points were given. Firms also received 1 point if they described an affirmative action program in their letter without sending a brochure. Nonresponding firms

were allotted no points. This coding produced a scale from 0 to 6, with 6 being most responsive to affirmative action. Codings were made by the author and an assistant with perfect agreement, possibly because of the concrete discriminability of code categories. The median code across firms was between 2-3, and only 19 percent of the firms received 5 or more points.

The primary purpose in coding the contents of replies was to establish the validity of the responsiveness measures. The two measures correlated highly for the full sample of 78 firms ($r = -.89$) and also for the replying sample of 59 firms ($r = -.69$), which suggests that the measures are tapping related behaviors.

It is assumed that replies reflected a firm's affirmative actions to attract women. In order to examine this and to provide a validity check on the dependent measured, a sample of MBAs was given the return mail of five organizations, selected from the high and low ends of the responsiveness codings. Ten MBAs, five women and five men, were interviewed, a small sample but sufficiently large to discriminate the firms' attractiveness to women. They were told that the materials were from U.S. firms about job opportunities. No mention was made of women. Each student ranked the five replies according to how much the firms were trying to attract him/her to apply for a job. The difference between the rankings of the men and women (Mann-Whitney $U = 16$; $p < .01$) indicated that the organizations coded most responsive appealed most to women and least to men. Thus, despite the small sample, the replies clearly discriminate in their relative attractiveness to men and women MBAs. That the women found some firms more attractive than others and the men the reverse implies that both see something in the materials that signals a sexual bias. Thus, each might note, "Gee, this one's telling me they're looking for men (women)... and since I'm not a man (woman), there'd be no sense in applying." Bem and Bem (1973) found that women avoided responding to newspaper want ads for jobs labeled "male jobs" but responded to the same ads when they were for "female jobs."

To clarify further the responsiveness measures, a second validity check was made. Some firms were sent a second inquiry seven months later. The second letter, mailed to personnel directors, advised that the Business Administration department was trying to learn what qualities were sought in hiring candidates. Included were profiles of four men and four women, said to be past graduates of the department. In addition to sex, the eight varied independently on prior job experience, grades, and marital status. The profiles gave bogus histories indicating the individuals were either good employment prospects or not. The bogus profiles were constructed in the following manner: Actual MBA resumes were scanned, and very positive and moderately low statements about job experience and grades were sampled. The statements then were randomly assigned to profiles with the constraint that half the profiles were constructed to be high on both traits (HH), high and low on either (HL, LH), or low in both (LL).

Sex then was randomly assigned to one of each of the four profile types. Status as married or single was randomly and equally assigned to profiles within each sex category. The result was that marital, job, and grade differences were roughly equated for male and female profiles.

Personnel directors rated the profiles according to how much they would consider hiring such individuals. Of the 35 firms that were sent profiles, 12 returned completed responses. For each firm, male profiles were consistently rated higher than female profiles. However, the more responsive the firm had been coded, the less the rating bias toward male profiles ($r = -.517$; $p < .05$). Although these 12 can hardly be said to represent the entire 78 firms, the correlation is consistent with the concept of responsiveness that was assumed. That only 12 firms were involved in this operation is important only if the selection spuriously produced the outcome, which does not seem likely.

ANALYSES AND RESULTS

It was hypothesized that an organization would be influenced by another depending upon the extent to which it is pressured with demands and depends upon the other organization for resources relative to the other's dependence upon it. This suggested that firms with large nondefense sales would show more affirmative action the larger the proportion of their sales obtained from the government and the smaller their proportion of a procurement supplied the government. Firms with large nondefense sales were expected to be large visible consumer product firms frequently targeted for social change. Firms with fewer nondefense sales, on the other hand, because they would be less in the public eye and less pressured with demands, were expected to show less responsiveness to affirmative action. Data relevant to these expectations are presented below.

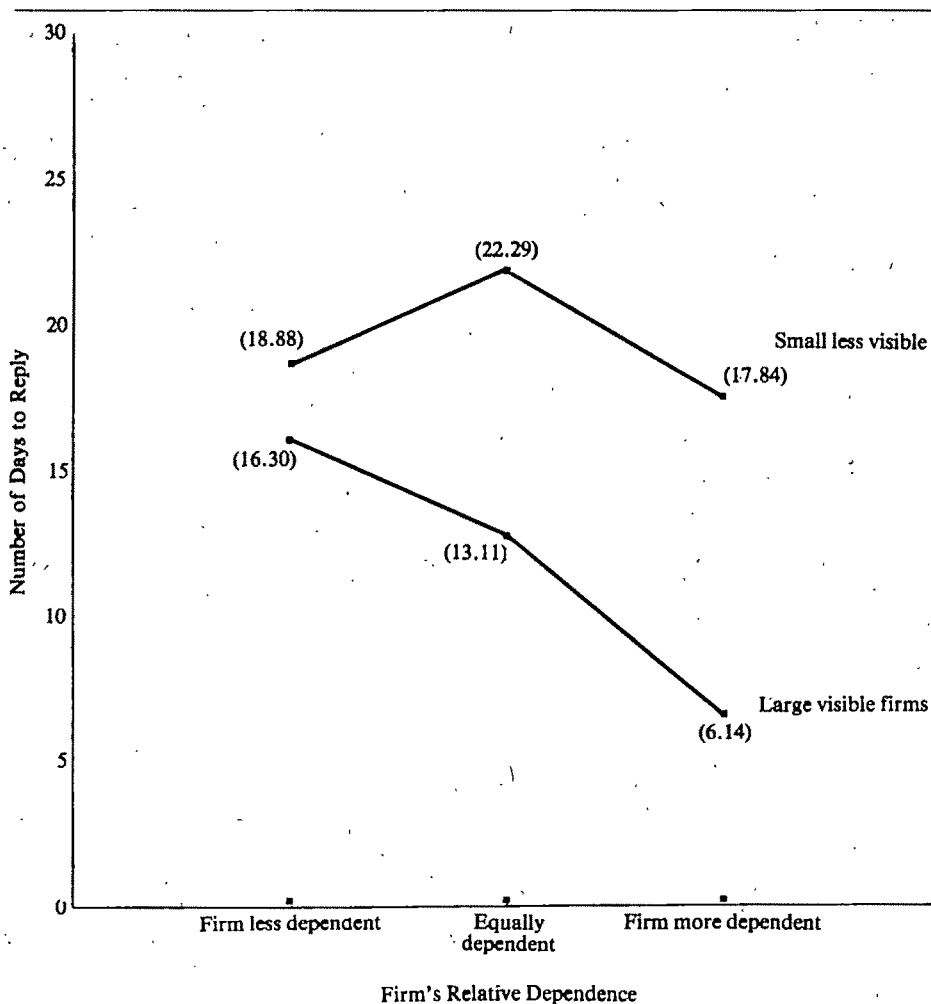
Large Visible Firms

Indirect evidence supports the assumption that firms with large nondefense sales are more visible targets for social change. Such firms tend to be consumer product firms. The amount of firms' nondefense sales correlated negatively with the proportion of sales obtained from the government ($r = -.25$; $p < .05$), indicating that the primary business of firms with large nondefense sales was not defense contracting. Moreover, the amount of nondefense sales correlated positively with the number of consumer products (brands) carried by the firm ($r = .67$; $p < .05$), estimated from data collected by CEP (1972a).

It also can be shown that such firms are singled out for social change. The CEP is a public interest group that monitors government and industrial activities in the interest of changing economic priorities to favor current conceptions of social welfare. Over the years CEP has released reports on corporate impacts on social problems, such as pollution, and

has advocated that social action be taken against some organizations (1972b). Of the companies singled out as targets for social action, 20 were among the 26 large nondefense firms, and 21 were among the 52 firms with smaller amounts of nondefense sales. The difference in proportions (.77 versus .40) is significant (chi-square = 9.28). As additional evidence, the CEP recently released a publication entitled "Guide to Corporations: A Social Perspective" (1974), describing the social impacts of 43 nonrepresentative corporations. Eighteen of the 43 were in the study sample of 78, and 17 of the 18 were among the large nondefense corporations.

FIGURE 1
Response Delays of Firms as a Function of Their Nondefense Sales
and Their Relative Dependence in Exchanges with the Government
 (D_{ab}/D_{ba})



Thus there is some indication that firms so classified were in fact the more visible targets for social change, and it is assumed that they were more likely to be pressured for affirmative action demands.

Firm and Government Dependence

To examine if the visibility of defense contractors interacted with their dependencies and the government's dependencies, an analysis of variance was conducted on firms classified according to their nondefense sales and their relative dependencies. The ratio of a firm's proportion of sales to the government divided by its share of a procurement supplied to the government was computed, and all firms were grouped into thirds. The top third were those firms that were more dependent on the government than the government was upon them; the bottom third were those that were less dependent on the government than the government was upon them. Within each third, the firms with larger and smaller nondefense sales were further distinguished. Analysis of variance was conducted on two responsiveness measures for the six groups. The mean number of days firms took to respond to the inquiry is plotted in Figure 1 for each of the six groups.

As can be seen in Figure 1, the number of days it took firms to respond was inversely related to their relative dependencies. The less dependent firms took longer to respond than did the more dependent firms ($F(1,72)$ linear = 6.85; $p < .05$). This inverse relationship is more evident for firms classified as large visible organizations. The least dependent firms took 16.30 days to reply. The most dependent took only 6.14 days, and the intermediately powerful were in between, with 13.11 days. The linear trend for large visible firms is large and significant ($F(1,72) = 16.07$; $p < .01$). The linear trend for smaller, less visible firms is not significant ($F(1,72) = 2.58$). The linear interaction between visibility and relative dependencies is ($F(1,72) = 4.40$; $p < .05$).

In addition to the interaction of relative dependencies with a firm's nondefense sales, the analysis of variance also indicates a significant main effect for nondefense sales. Larger firms responded sooner than did smaller firms ($F(1,72) = 34.04$; $p < .001$).

Test of Interactive Hypothesis

A simultaneous contrast of the means (Winer, 1962) in Figure 1 was made to test directly the hypothesized interaction between visibility and relative dependencies. For firms with fewer nondefense sales, applications were made of the coefficients of +1, +1 and +1 to the three levels of relative dependency, consistent with the argument that, in the absence of pressure for affirmative action, responsiveness will be less and unaffected by organizational dependencies. For firms with larger nondefense sales, applications were made of the coefficients of +1, -1 and -3, consistent with the argument that responsiveness will be inversely related to an

organization's dependence relative to that of the government. This set of coefficients perfectly describes the hypothesized interaction between the two variables (see Model I: $R_{ab} = PD_{ba} \times (D_{ab}/D_{ba})$). The proportion of variance associated with the hypothesized interaction was computed, using the two variables. The hypothesis accounts for 43.6 percent of the total variance and is significant ($F(1,76) = 58.75; p < .001$). A similar analysis was made on the coded responsiveness measure with similar results; 27.9 percent of the variance was associated with the hypothesized interaction ($F(1,76) = 29.41; p < .001$).

Another test for this interactive effect was made by comparing the regression lines for large and small firms, that is, comparing $R = c + bP$, where R is responsiveness, P is power in exchanges, and c and b are constants. The regression for firms with large nondefense sales was significant and also significantly different from the regression for smaller firms, which was not significant.

Test of Alternative Models

The data displayed in Figure 1 and the analysis of variance test suggest clearly that the responsiveness of firms was an interactive effect of nondefense sales and relative dependencies. It is possible to make a similar test of this argument by the use of regression analysis. Although a regression analysis will not indicate the form of the interaction, it will enable testing the argument without grouping the variables. It also enables an

TABLE 1
Proportions of Variance Accounted for by Alternative Models
of Responsiveness.

Alternative Models ^a	R ²	
	Number of Days to Reply	Coded Responsiveness
I R = Total sales (\$TS)	.13	.19
II R = Total nondefense sales (\$NDS)	.26	.17
III R = Proportion of sales to government (%FD)	.02 ^b	.05
IV R = Proportion of supply by firms (%GD)	.07	.05
V R = (%FD) - (%GD)	.10	.11
VI R = (\$NDS) + (%FD) - (%GD)	.41	.23
VII R = $\frac{(\%FD)}{(\%GD)}$.10	.13
VIII R = $(\$NDS) + \frac{(\%FD)}{(\%GD)}$.43	.28
IX R = $(\$NDS) \times \frac{\%FD}{\%GD}$.46	.34

^aSigns on variables are the hypothesized directions of effects.

^bOpposite hypothesized direction.

examination of the value of this interactive formulation relative to alternative formulations.

Table 1 presents the results of multiple regression analyses for nine alternative formulations, for both measures of responsiveness. For each analysis, the squared multiple correlation was computed for the formulation being tested. The variables and data used were: %*FD* = firm dependency, proportion of firms' sales to government; %*GD* = government dependency, proportion of procurement supplied by firms; \$*TS* = total sales of the firms; \$*NDS* = firm's total nondefense sales; (%*FD*/%*GD*) = relative dependencies in exchanges, firm dependency relative to government dependency; and *R* = responsiveness measures.

The results of these comparative analyses indicate that the most critical factors for responsiveness were the nondefense sales of the firms and their dependence relative to that of the government. Whenever these factors enter into the equations, the variance accounted for is substantially larger than when they do not. The results also indicate that an interactive model of the variables is more adequate in accounting for the data (Model IX) than is an additive model (Models VI and VIII).

Size and Responsiveness

A correlation was found between the total sales of a firm and its responsiveness (.36 for the number of days to reply; .44 for the coded responsiveness measure). It might be seen from this that the affirmative action responses are the result of a firm's size. Clearly, larger firms would have more resources with which to respond, or may be more used to answering inquiries about employment from universities, or they may have had more resources to devote to developing and implementing affirmative action programs.

The relationship of sales to the responsiveness measures must be interpreted with caution, however, because of the interaction between nondefense sales and dependencies of contractors and the government. The presence of an interaction of the nature presented in Figure 1 means that the main effects will be overestimated because they are confounded with the interaction. Figure 1 shows that the variables (nondefense sales and the relative dependencies of contractors with the government) have a conjunctive effect on responsiveness. Greater responsiveness obtains only when both variables are present together. Thus, the significant effect reported for nondefense sales and the lesser effect for total sales are partially a result of the interaction of this variable with the measures of relative dependence. The effect for sales (either total sales or nondefense sales) is not significantly associated with the responsiveness measures after partialling out the effect associated with the interaction. Moreover, when the firms are grouped into thirds according to their relative dependencies in exchanges with the government, it is found that size correlates with the

responsiveness measures only in the lowest third (when government dependencies are high relative to firm dependencies).

Dependence and Responsiveness

Although the dependencies of contractors and the government had an effect when they interacted with the amount of nondefense sales, neither had an effect on affirmative action responses independent of sales. The analysis of variance showed the effect for firm dependence (proportion of sales to the government) to be virtually zero (F 's, n.s.) for both responsiveness measures. The dependence of the government on the firm (proportion of a procurement supplied by the firm), on the other hand, significantly affected the number of days it took the firm to respond ($F(1,70) = 5.27$; $p < .05$), but showed no effect for the coded responsiveness measure.

However, as with the case for the main effect for nondefense sales, the main effect for government dependency vanishes after controlling for the hypothesized interaction.

DISCUSSION

The results of the present study suggest that firms showed affirmative action toward hiring women MBAs as a function of their nondefense sales and their dependencies relative to that of the government in exchanges with the government. Firms with large nondefense sales that also were more dependent on the government appeared most responsive to affirmative action. They responded to the business school's inquiry sooner, and they more favorably pursued women job candidates by sending brochures that pictured women or addressed opportunities for women in management. In contrast, firms that were least dependent on the government or that had small nondefense sales were least responsive toward the inquiry into job opportunities for women MBAs. Further, the results indicate that the firms with large nondefense sales tend to be among those that are targeted for more social change. They also tend to be among the large consumer product firms of U.S. industry. Moreover, although it was found that both the amount of nondefense and the amount of a firm's total sales were related to the response of the firm, the results could not be attributed to size per se because these effects were eliminated when the interaction was partialled out.

In short, the results are consistent with the model of interorganizational influence hypothesized, namely, that the affirmative actions of contractors are a function of their relative dependence in exchanges with the government and their status as large visible corporations.

The most important finding from the present study is that the affirmative actions of defense contractors in 1972-1973 were not a simple function of the dependence on the U.S. government for sales. Though

hypothesized, the results also are somewhat striking. The U.S. laws covering affirmative action gain their force primarily because compliance is tied to the business a firm does with the government. By law, every contractor is required to take affirmative action in hiring women and minorities. The threat of not doing so is the loss of business with the government. Because the cost of losing business is a direct function of the proportion of a firm's sales obtained from the government, it is notable that a firm's affirmative action is no simple function of its sales dependence.

Instead of a simple direct function, a firm's dependence on the government was found to have an effect only when the firm also had large nondefense sales or it supplied a small proportion of a government procurement. In a sense, the most responsive firms were those that were not major government contractors. The least responsive were the major contractors, major in the sense that the government depended most upon them and in the sense that they had few sales that were not for defense products. Such firms did not respond at all to the inquiry about job opportunities for women MBAs, or they penciled discouraging replies. Stated in this way, the outcome almost seems like a contradiction. The equal employment opportunity demands of the government are tied to its contracting with firms. Thus it is a little more than unusual that the firms displaying the most affirmative action were the large nondefense firms and the least responsive were the major contractors.

Despite the unusual nature of the results, it is quite possible that major consumer product firms were more responsive because they were not major contractors. They were in a sense the best targets for affirmative action demands. Their visibility as major consumer product firms targets them for social action of all sorts. And because they were not major contractors on which the government depended for defense procurement, there would be few costs for the government in applying pressure for affirmative action. With major contractors, the government may have hesitated in pressing demands. The potential costs for the government of pressing an unfavorable policy on contractors varies inversely with its dependence on them. Thus, if the government were selecting targets for enforcing the affirmative action policy it might more likely select firms that were not major contractors but were major consumer product firms around which support for the enforcement could more easily be marshalled.

There is no direct evidence about the enforcement policies of the U.S. government regarding the firms studied here during the early 1970s, and the above comments must be taken as pure conjecture. However, they are not inconsistent with the results observed. This conjecture is raised because it offers a slightly different interpretation to the data than the one that guided the study in the first place. The initial model asserted that the affirmative actions of contractors would be a function of their relative dependencies interacting with pressures for compliance, which in turn were assumed to vary directly with the nondefense sales of firms. That is,

we assumed: $R_{ab} = PD_{ba} \times (D_{ab}/D_{ba})$; and, $PD_{ba} = \$NDS_b$. An alternative model, one that summarizes the discussion above, however, suggests that the effect of the government's dependency on the target organization is to reduce the pressure for compliance, PD_{ba} . This model would assert:

$$R_{ab} = PD_{ba} \times D_{ab}; \text{ and, } PD_{ba} = \$NDS_b \times \frac{1}{D_{ba}}.$$

Empirically, in the present situation the two models would make no substantially different implications for the results. Both predict affirmative action to be an interactive function of nondefense sales and the dependencies of the government and its contractors. The two alternatives, however, differ theoretically by positing different mechanisms for interorganizational influence. The first argues that the effect of government dependence is on the response of contractors to government pressures. Essentially, contractors resist government pressures when they know the government depends on them. The first model then assumes that the dependence of an influencing organization affects the behavior of the target organization. The second model, on the other hand, argues that government dependence affects the behavior of the government in applying compliance pressure on contractors. More generally, the influencing organization restricts its own attempts at influence to organizations with which it is least dependent. Such an interpretation is consistent with Crenson's (1971) finding that communities voluntarily restrained their enforcement of clean air standards when the community depended heavily on the pollutor.

As mentioned, there is no way from the present data to distinguish these two alternative models. The data merely show that the three variables interacted to affect the affirmative action responses of firms. Precisely why is not clear. What is clear is that the dependencies of the target organizations were not sufficient to account for their responses, suggesting that the relationship between organizational dependencies and influence is not isomorphic. Rather, an understanding of how interorganizational dependencies affect organizational behaviors requires more sophisticated hypotheses involving not only the characteristics of relationships between organizations but also other factors. What these factors might be can only be conjectured at this point. There has not been sufficient empirical work on interorganizational influences to provide much guidance. Pfeffer and Salancik (1978) have enumerated several factors, such as the observability and discretionary nature of a targeted organization's behavior. But further empirical work is needed to determine the value of these suggestions.

One study does suggest that one organization's dependencies on another may affect its willingness to pressure the latter with demands for change. Crenson (1971) has shown that the size of steel companies is a critical factor in avoiding demands for cleaner air. This finding seems to contradict the argument that larger firms are more subject to social pressures for change. However, there is an important difference between pollution reform and discrimination reform. With pollution, a firm that dominates

the economy could argue successfully that it would have to close down if it complied; it then could obtain social support for maintaining employment in a given area. However, it would be more difficult for a firm to gain social support by openly opposing a national policy with so obvious a moral value as the equality of opportunity. That would be countering a founding principle of the nation. There are few clear indications that equal opportunity per se opposes vital community interests. Thus, in this case, the very size of a firm makes it more vulnerable to social pressures for change quite in contrast with an issue like pollution. A general hypothesis that could be tested in the future would be that an organization's dominance in a social environment should interact with the strength of a social consensus to produce compliance with social demands. A dominant firm would be both most likely and least likely to comply, depending on the social/moral consensus behind the demand.

Perhaps one of the benefits of the present study is that it illustrates a methodology for studying a difficult topic such as interorganizational influence. The lack of empirical work on organizational influence and dependence is not surprising when one considers that organizations may be reluctant to admit either attempting to submit or submitting to the demands of one another. The method introduced here, awkwardly labeled stimulated outcroppings, has proved to be feasible for gathering comparative data on such potentially sensitive issues as interorganizational influence. One can imagine many variations. One could send a legitimate letter to firms, complaining or praising the firm about a relevant action, and observe its response. For variation and for information on organizational influence, one could indicate various sources for carbon copies (e.g., "cc: Office of Equal Opportunity") and note whether they make a difference in the organizations' responses. Or one could cash checks at banks and observe differences in transactions as a function of bank characteristics, locales, or customers. One could telephone organizations about damaged products and observe how many connections are required to locate an office that can handle the query, thus learning about the information transmissions of the organization or its concern for customers. The method has the benefit of being unobtrusive and replicable. The important condition for the use of the method of stimulated outcropping is that one provokes responses that represent the organization's normal ways of behaving relevant to the proposition of interest. It is particularly useful for the kinds of inquiries for which it was created here.

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The "Good Manager": Masculine or Androgynous?¹

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The application of the Bem Sex-Role Inventory in a study of 684 business students failed to support the hypothesis that a good manager would be seen as androgynous (possessing both masculine and feminine characteristics). Instead, the good manager was described in masculine terms. Graduate women also described themselves in masculine terms.

The purpose of this study was to investigate whether, in light of changing views toward traditional sex-role stereotypes and the growing demand for women as managers, there has been a shift away from sex typing of the managerial profession as masculine.

Historically, sex-role stereotypes have powerfully influenced individuals' standards and evaluations of behavior (Broverman, Vogel, Broverman, Clarkson, & Rosenkrantz, 1972). In particular, the notion that men and masculine characteristics are more highly valued than women and feminine characteristics has been pervasive. Several studies (Broverman et al., 1972) found agreement by males and females on the socially desirable characteristics of adults as masculine. Others found that performance by women is evaluated less favorably than is the same performance by men (Goldberg, 1968; Pheterson, Kiesler, & Goldberg, 1971). Basil (1973) discovered that personal attributes rated as highly important in upper management levels also were perceived as more likely to be found in men than women. Schein (1973, 1975) found agreement by male and female managers on a decidedly masculine profile of the successful manager.

Some recent evidence indicates a shift away from sex-role stereotypes for both women (Kravetz, 1976) and men (Tavris, 1977). Change also has

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been occurring in the theoretical conception of sex-role stereotypes. In research which has received wide attention, Bem (1974, 1975) advocated the concept of androgyny, referring to a high propensity of both feminine and masculine characteristics in an individual, as representing a more flexible standard of psychological health than sex-typed behavior. She argued that (1) masculinity and femininity are complementary, not opposite positive domains of traits and behaviors, (2) an individual of either sex may be both masculine and feminine, or instrumental and expressive, depending on the given situation, and (3) it is each individual's sex-role identity, not sex, that magnifies the degree to which certain traits and behaviors are manifested.

Underscoring the importance of the androgyny concept, an association between androgyny and more effective behavior was observed in a variety of nonorganizational situations (Bem, 1975; Spence, Helmreich, & Stapp, 1975; Bem & Lenny, 1976; Heilbrun, 1976). Until the present study, the concept had not been applied to work settings. Its potential applicability was obvious: If the more effective person is androgynous, the more effective *manager* may be androgynous as well.

The number of women in management positions has been increasing, due to changes in cultural norms concerning the role of women and the impetus of federal legislation banning sex discrimination at all levels in organizations. As more women become managers, it is possible that traditional masculine oriented standards for managerial behavior are being replaced by androgynous standards. On the other hand, it also is possible that new female managers adopt masculine traits and behaviors typical of male managers to succeed in a still-masculine working world.

The present study was designed to explore these speculations further. Specifically, *it was hypothesized that the "good manager" is now perceived as androgynous in sex-role identification*. The relationship between individuals' own sex-role identifications and their perceptions of a good manager also was examined.

METHOD

Two groups of subjects who differed sharply in age, education, and work experience were used. One group consisted of 574 undergraduate business students attending courses in various universities, with a median age of 20.2 years and 70% male. The second group consisted of 110 part-time (evening) MBA students also attending courses, nearly all of whom also held full-time jobs. Their median age was 26.8 years, and they were 82% male. Data were collected in the fall of 1976 and spring of 1977.

Each individual completed the Bem Sex-Role Inventory (BSRI) (Bem, 1974) both for him/herself and for a good manager. The BSRI contains 20 items characteristic of the masculine sex-role stereotype (e.g., self-reliant, defends own beliefs, ambitious), 20 items characteristic of the feminine sex-role stereotype (e.g., sympathetic, yielding, shy), and 20 items not

associated exclusively with either stereotype (e.g., helpful, conscientious, conceited). Items were rated on a 7-point scale, ranging from "never or almost never true" (1) to "always or almost always true" (7).

Masculinity and femininity self-scores were calculated for each individual as the average of scores on the masculine and feminine items in his/her self-description. The median masculinity and femininity self-scores then were calculated for the entire sample combined, with graduate females, undergraduate females, and graduate males weighted more heavily than undergraduate males to equalize their numbers statistically. Each individual was then classified into a sex-role group or self-group as follows:

		<i>Masculinity Self-Score</i>	
		Below median	Above median
<i>Femininity Self-Score</i>	Above median	Feminine	Androgynous
	Below median	Undifferentiated	Masculine

Masculinity and femininity "good-manager scores" were calculated from each individual's description of a good manager using the same procedure as for the self-description. The good-manager description was classified as androgynous, masculine, feminine, or undifferentiated according to the median masculinity and femininity self-scores, i.e., relative to the same medians as those used to classify individuals into self-groups, to allow direct comparison of how individuals described a good manager and themselves. This classification was called the individual's "good-manager group."

RESULTS

Good-Manager Descriptions

The hypothesis stated that individuals perceive a good manager to be androgynous in sex-role identification. Section a. of Table 1 demonstrates overwhelming preference for a masculine manager, discounting the hypothesis. Over 65 percent of subjects in all four subsets of the sample ($p < .001$) characterized a good manager in strongly masculine terms. Less than 25 percent of subjects in any subset described a good manager in androgynous terms. Differences between good-manager group distributions by sex were insignificant for both part time graduates and undergraduates. Comparison with self-group distributions (section b. of Table 1) showed that a higher proportion of individuals were classified into the masculine good-manager group than in the masculine self-group and a lower proportion into the androgynous good-manager group than in the androgynous self-group for all subsets of subjects. Despite differences

in self-group distributions as indicated, the good-manager group distributions were remarkably similar in their support for a masculine manager.

Inspection of the median self-scores used for creation of the good-manager group reveals further the resounding rejection of the hypothesis. After weighting due to unequal membership in the four subsets, the median masculinity and femininity self-scores were 5.09 and 4.69, respectively. Thus a subject who rated a good manager as higher on masculinity than femininity (e.g., masculinity good-manager score = 5.0, femininity good-manager = 4.8) could have been placed in the feminine good-manager group rather than the masculine or androgynous good-manager group as the good-manager score might appear to indicate. The significant

TABLE 1
Good-Manager Group and Self-Group Classified by Sex

	Undergraduate				Part-Time Graduate			
	Males		Females		Males		Female	
	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%	<i>n</i>	%
a. <i>Good-manager group:</i>								
Androgynous	66	16.3 ^b	31	18.2 ^d	19	21.1	2	10.0
Masculine	281	69.6 ^a	113	66.5 ^a	65	72.2 ^a	16	80.0 ^a
Feminine	4	1.0 ^b	4	2.4 ^b	2	2.2 ^b	0	0.0 ^c
Undifferentiated	53	13.1 ^b	22	12.9 ^b	4	4.5 ^b	2	10.0
	404	100.0%	170	100.0%	90	100.0%	20	100.0%
	Chi-square = 2.02 with 3 degrees of freedom (<i>p</i> = n.s.)				Chi-square = 2.56 with 3 degrees of freedom (<i>p</i> = n.s.)			
b. <i>Self-group:</i>								
Androgynous	88	21.8	38	22.4	25	27.8	8	40.0
Masculine	148	36.6 ^a	15	8.8 ^b	41	45.5 ^a	3	15.0
Feminine	59	14.6 ^b	80	47.1 ^a	6	6.7 ^b	4	20.0
Undifferentiated	109	27.0	37	21.7	18	20.0	5	25.0
	404	100.0%	170	100.0%	90	100.0%	20	100.0%
	Chi-square = 85.93 with 3 degrees of freedom (<i>p</i> < .001)				Chi-square = 8.03 with 3 degrees of freedom (<i>p</i> < .05)			

^aProportion larger than random, $p < .001$.

^bProportion smaller than random, $p < .001$.

^cProportion smaller than random, $p < .01$.

^dProportion smaller than random, $p < .05$.

TABLE 2
Good-Manager Scores and Self-Scores Classified by Sex

	<i>Undergraduates</i>			<i>Part Time Graduates</i>		
	<i>Males</i> (<i>N</i> = 404)	<i>Females</i> (<i>N</i> = 170)	<i>F</i>	<i>Males</i> (<i>N</i> = 90)	<i>Females</i> (<i>N</i> = 20)	<i>F</i>
a. Mean good-manager scores:						
Masculinity	5.62	5.60	.11	5.76	5.67	.67
Femininity	4.18	4.24	1.85	4.22	4.24	.04
b. Mean self-scores:						
Masculinity	5.21	4.73	67.90*	5.37	5.23	.90
Femininity	4.50	4.93	86.07*	4.46	4.65	2.44

* $p < .001$

membership in the masculine good-manager group, despite this phenomenon, emphasized the degree to which the hypothesis was rejected.

Analysis of good-manager scores and self-scores yielded comparable results. Good-manager scores were virtually the same for the four subsets of subjects (section a. of Table 2) despite differences in self-scores, particularly between undergraduate males and females (section b. of Table 2). Good-manager scores were higher on masculinity and lower on femininity than were self-scores for all subsets, with undergraduate females exhibiting the greatest differences between self-scores and good-manager scores.

Relationships

Individuals' sex-role identifications were related to their perceptions of a good manager. Sections a. and b. of Table 3 demonstrate the existence of a significant relationship between self-group and good-manager group membership for both undergraduates and part time graduates ($p < .001$). Analysis of correlations between self-scores and good-manager scores yielded similar results. Strong correspondence was observed between comparable self-scores and good-manager scores for undergraduates and part time graduates in each sex, as the correlations ranged from .30 to .71 and all but one were significant at the .001 level.

The nature of the relationship between self-group and good-manager group membership was discerned from the data in Table 3. As seen in row 1 of Table 3, the percentage of androgynous good-manager group membership was higher in the androgynous self-group than in any other self-group. Analogous results held for the other self-groups: for example, the percentage of masculine good-manager group membership was highest in the masculine self-group. Only row 3 of section b. of Table 3, with very small numbers, deviated from this pattern.

The significance of these results was determined by applying a significance test for the difference between two proportions (Bruning & Kintz, 1968). Within each row, the underlined percentage was matched with each of the other three percentages. For example, the following question was asked for row 2 of Table 3a: "Is the 83.5% masculine good-manager group membership significantly higher than (1) the 68.5% membership for the androgynous self-group, (2) the 55.4% membership for the feminine self-group, and (3) the 65.1% membership for the undifferentiated self-group?" All three differences in proportions were significant at the .001 level, and the question was answered yes as indicated. Differences in good-manager group proportions were significant for three of five rows tested and close to significant for a fourth ($p = .052$ for row 2, Table 3b). This analysis demonstrated that individuals tended to describe a good manager in the same sex-role terms as themselves. However, over 50% of the members in each self-group for both undergraduates and part time graduates ($p < .001$ in all cases, Tables 3a and 3b) still preferred a masculine manager.

TABLE 3
Good-Manager Group Classified by Self-Group^a

a. Undergraduate									
	Androgynous		Masculine		Feminine		Undifferentiated		Totals
	n	%	n	%	n	%	n	%	n
Good-manager group:									
Androgynous	40	31.5	9	5.5	38	27.3	10	6.8	97
Masculine	87	68.5	136	83.5*	77	55.4	95	65.1	395
Feminine	0	0.0	0	0.0	5	3.6 ^b	3	2.1	8
Undifferentiated	0	0.0	18	11.0	19	13.7	38	26.0*	75
Totals	127	100.0	163	100.0	139	100.0	146	100.0	575
Chi-Square = 100.62 with 9 degrees of freedom ($p < .001$)									
b. Part time graduate									
	Androgynous		Masculine		Feminine		Undifferentiated		Totals
	n	%	n	%	n	%	n	%	n
Good-manager group:									
Androgynous	14	42.4*	3	6.8	1	10.0	3	13.0	21
Masculine	18	54.6	40	90.9	8	80.0	15	65.3	81
Feminine	1	3.0	0	0.0	0	0.0	1	4.3 ^b	2
Undifferentiated	0	0.0	1	2.3	1	10.0	4	17.4 ^b	6
Totals	33	100.0	44	100.0	10	100.0	23	100.0	110
Chi square = 28.51 with 9 degrees of freedom ($p < .001$)									

^aLargest percentage in each row is underlined. Degree of significance shown is that for least significant difference between underlined percentage and each other percentage in the row. Masculine proportion in each column is larger than random, $p < .001$.

^bSignificance not determined due to small numbers in row.

* $p < .001$

DISCUSSION

The two groups of subjects described a good manager as masculine in similar proportions despite considerable differences in their composition: one a younger, less experienced, undergraduate student population and the other an older, more experienced, full time employee/part time graduate student population. If changes in sex-role stereotypes were altering individuals' perceptions of a good manager as theorized, the impact probably would be greater among the younger group, with that group showing more of a preference for an androgynous manager than would the older group. No such impact appeared in this study. If a growing number of women managers were affecting the perceptions as speculated, the impact might be expected to show more in the full time working group than in the full time student group. Either the workers in the sample had not experienced any change in numbers of women managers in their organization, or this predicted effect was also nonexistent. If individuals' own sex-role identifications were having a strong impact on results, some self-groups would prefer a masculine manager, and others would not. All self-groups within each group of subjects significantly preferred a masculine manager. According to these results, an ethic that "masculine is best in management" continues to be strongly held by both men and women.

The lack of difference in results between males and females in both groups confirmed Schein's finding (1973, 1975) that sex of the evaluator is not a factor in determining requisite management characteristics. As was found in her studies, in the present study both sexes saw managers as appropriately masculine. A noteworthy finding for undergraduates, also confirming Schein (1975), was that females saw a good manager as more unlike themselves than did males. The long run implication may be that either (1) these women hold back in developing their managerial skills and in seeking management positions or (2) they adapt themselves, as apparently had the graduate women in the study, to conform to masculine standards. Such behaviors on their part would continue to foster sex-role stereotypes that proclaim that men or masculine characteristics are more desirable in management.

Though males and females in both groups agreed on the characteristics of a good manager, there were differences on self-scores depending on student status. Undergraduate men and women were typically masculine and feminine. Graduate men and women, however, did not differ markedly on masculinity and femininity. In particular, graduate women saw themselves as more masculine than feminine. Although these findings may be indicative of change, they probably are more a result of self-selection or socialization processes. More masculine women may take graduate business courses, especially if they associate management with masculinity. Or, finding themselves in a masculine oriented environment, they may take on characteristics believed necessary for survival and advancement in it.

Masculinity and femininity scores are based on ratings made in 1972-1973 (Bem, 1974) that particular traits such as "self-reliant" or "sympathetic" should be scored on the masculine or feminine scale. Consensus over what is a masculine or feminine trait may have shifted significantly since then, thus rendering results an artifact of an outdated scoring key. Comparison of self-scores for undergraduates (section b. of Table 2) collected in 1976-1977 with normative data collected from undergraduates four years earlier (Table 4) suggests that this is not the case. Masculinity scores were slightly higher overall, but the directions of differences in self-scores for men and women remained the same, indicating little change in self-perceptions from before. It is more likely that slightly higher masculinity scores were found in the current sample because it was composed of business rather than psychology students, as in Bem's (1974) study. This possibility is reinforced by the differences found between part time graduate self-scores and those of undergraduates in Table 2. Graduate students had the highest masculinity scores, suggesting again that self-selection or socialization processes may be at work. Although change in sex-role stereotypes may be occurring, thus rendering the BSRI scoring key obsolete, it is impossible to tell from the data in Tables 2 and 4 because of the differences in the samples.

TABLE 4
Self-Scores Classified by Sex: Normative Samples*

	<i>Stanford University Undergraduates</i>		<i>Foothill Junior College Undergraduates</i>	
	<i>Males (N = 444)</i>	<i>Females (N = 279)</i>	<i>Males (N = 117)</i>	<i>Females (N = 77)</i>
Masculinity	4.97	4.57	4.56	4.55
Femininity	4.44	5.01	4.62	5.08

*From Table 6, Bem, 1974.

Subjects in the study described a good manager in masculine rather than androgynous terms. Conceptually, androgyny means a mixture of masculine and feminine traits, not the best of both. It might be argued that the subjects preferred a masculine manager because they saw masculine traits as more desirable in general, particularly as compared with feminine traits. When the BSRI was constructed, however, it carefully matched the masculinity and femininity scales for social desirability. In addition, it included 20 "neutral" items, which in fact constituted a social desirability scale, to determine the extent to which subjects described themselves favorably, as well as in masculine and feminine terms. In the present study, correlations between that social desirability scale and masculinity and femininity scores were about the same (low positive), except for the graduate females. For them, social desirability was more highly correlated with masculinity ($r = .51$) than with femininity

($r = .21$). This may explain further why they saw themselves in such masculine terms. They believed masculinity to be more desirable. For the other subgroups, however, masculinity *per se* was not necessarily more desirable, only when perceived in terms of the characteristics of a good manager.

Although results of this study did not support the hypothesis that a good manager would be seen as androgynous, further examination of the applicability of the androgyny concept to managerial practices may still be warranted. Osborn and Vicars (1976) suggested that results confirming sex-role stereotypes are more likely to be found in artificial, short term, laboratory situations than in long term, real life, field settings. Evaluation of actual practices in light of the androgyny concept should indicate finally whether the concept has any value in explaining managerial effectiveness.

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Research Notes

ON THE INTERCHANGEABILITY OF SIZE MEASURES

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The expanding size of organizations creates pressures for increased differentiation in organization structures. Such pressures may arise from the problems of communication, control, and supervision faced by large organizations (Caplow, 1957; Blau, 1970; Klatzsky, 1970; Blau & Schoenherr, 1971). Formal organizations cope with these problems by subdividing responsibilities along horizontal, vertical, and spatial dimensions. Dewar and Hage (1978) have recently argued that the relationship between size and vertical differentiation is stronger than that between size and horizontal differentiation. The former arises because large numbers require many supervisors. The latter, however, may arise only if economies of scale allow addition of certain specialized services such as those in legal, advertising, public relations, and fund raising areas.

Differentiated structures also create problems of their own. True, such structures enable organizations to reap the benefits resulting from specialization. But they also imply a need for coordination. The increasing differentiation in structure caused by increasing size intensifies the need for coordination in the organization, which in turn tends to restrain further differentiation. Thus, it is argued that structure differentiation may increase with size but only at a decreasing rate (Blau, 1970). A large number of studies provide empirical support for these hypotheses concerning both the magnitude and form of size-structure relationship (Pugh, Hickson, Hinings, & Turner, 1969; Hickson, Pugh, & Pheysey, 1969; Blau & Schoenherr, 1971; Dewar & Hage, 1978).

In his recent review, Kimberly (1976) states that the concept of size as it has been used in organization research is too global to permit precise determination of its importance in relation to structure. Although several measures of organization size exist, empirical studies of size-structure relationship generally employ, and offer generalizations based upon, only a single measure of size. Conceptually, different measures of size may be quite unrelated to each other. Operationally also, correlations among size measures are neither sufficiently consistent nor high enough to justify their being considered essentially interchangeable measures of the same concept. For this reason, Kimberly (1976) hypothesizes that different

configurations of size-structure relationship may well emerge depending upon the measure of size used.

The purpose of the present research is two-fold. First, it tests Kimberly's hypothesis using three measures of size. Second, it specifies the conditions of interchangeability among size measures. Specifically, it disagrees with Kimberly (1976) and others in that high correlations among size measures are considered a necessary but not sufficient condition for their interchangeability. An additional condition of proportionality among size measures is specified in this regard. Highly correlated measures, if not proportionally interrelated, still may be differently related with measures of organization structure.

Sample and Measures

The empirical analysis in the present study is based on data from 168 U.S. life insurance companies. Since a major proportion of size structure studies have used intratypical samples (Kimberly, 1976), it would be useful to examine the extent to which they are faced with the issue of (lack of) interchangeability among size measures. The data for the present study were collected using a pretested questionnaire. To ensure further the accuracy of report information, size data were verified from *BEST's Review*, Life Edition, published by A. M. Best Company. The organization charts provided by the responding companies were used to verify the reported information on structure dimensions.

The present study employs three measures of organization size: total number of salaried employees, total assets, and dollar volume of sales (which, in the case of life insurance companies, is indicated by premium income). These correspond to three of the four substantive aspects of size identified by Kimberly (1976), which are the personnel available to an organization, discretionary resources available to an organization, and organizational outputs. The fourth aspect, the physical capacity of an organization, is excluded due to its lack of applicability to life insurance companies. The four measures of organization structures used in the present study are: (a) *executive span of control*, defined as the number of subordinates (regardless of their level but excluding assistants and secretaries) directly reporting to the chief executive, (b) *functional differentiation*, defined as the number of functional divisions in the organization, (c) *vertical differentiation*, defined as the number of management levels in the deepest chain of command, and (d) *spatial diversity*, defined as the number of states in which the company operates for business.

Results

Table 1 shows the correlations between organization size and structure measures. Based on these, several conclusions can be drawn regarding the comparative strength and form of size-structure relationship across the

TABLE 1
Product Moment Correlations Between Organization Size and Structure
(N = 168)

Structure Measures	Size Measures			Log Size Measures		
	Employees	Sales	Assets	Employees	Sales	Assets
(1)	(2)	(3)	(4)	(5)	(6)	(7)
Span of control	.181* (4)*	.142 (4)	.103 (4)	.466** (4)	.487** (4)	.493** (4)
Functional differentiation	.216** (3)	.234** (3)	.236** (2)	.543** (3)	.457** (3)	.543** (3)
Spatial diversity	.253** (2)	.256** (2)	.231** (3)	.693** (2)	.717** (1)	.646** (2)
Vertical differentiation	.530** (1)	.529** (1)	.477** (1)	.734** (1)	.708** (2)	.705** (1)

*Numbers in parentheses indicate the relative ranks of correlations within each column.

*Significant at the .05 level

**Significant at the .01 level

three size measures. First, organization size and structure appear closely related regardless of how size is measured. This is evidenced in the fact that all correlations except two are statistically significant at or above the .05 level. Differences in correlations were also tested to assess the relative magnitude of size-structure relationship across the three size measures. In no case were the differences found to be significant.

Second, the pattern of size-structure relationship also is quite similar across the three size measures. The pattern in each case can be judged by the ranks based on relative magnitude of correlations between size and each structure measure. These ranks, shown in parentheses in Table 1, exhibit remarkable similarity. For example, in columns 2 to 4, the relationship between size and span of control is the weakest and that between size and vertical differentiation the strongest in all three cases. There is only a slight difference in the middle order rankings in case of one size measure, assets. The rankings of correlations when size is used in logarithmic form (columns 5 to 7) also display a similar pattern. In fact, they are identical except for a marginal difference involving one size measure, sales.

Third, not only are the magnitude and pattern of size-structure relationship similar, but the form also shows remarkable consistency across the three size measures. As noted earlier, Blau (1970) suggests size-structure relationship is nonlinear. More specifically, he argues that structure differentiation will increase with size but at a diminishing rate. If so, then logarithmic transformation of size should yield significantly higher correlations with measures of structure differentiation (Blau & Schoenherr, 1971). This appears to be true in the present study regardless of the size measure used. Table 1 shows the correlations between organization size and structure, with and without logarithmic transformations of size. All correlations increase when logarithmic size is used, the increase in each case being statistically significant at or above the .05 level.

Significant correlations among size measures are generally regarded as a sufficient condition for interchangeability among them. Size data in the present study do satisfy the above condition for interchangeability. The correlations between size measures are .88 between assets and number of employees, .95 between assets and sales, and .97 between number of employees and sales. However, more rigorous conditions are needed for interchangeability than the one specified above. The size measures must be not only highly correlated but also proportional to each other (Smythe, Boyes, & Peseau, 1975). The importance of the proportionality condition can be easily demonstrated.

Consider two measures of organization size, A and E , which are perfectly correlated so that all observations fall along a straight line. Thus,

$$A = a + bE \quad (i)$$

If A and E are proportional to each other, the intercept $a = 0$. If they are not proportional, $a \neq 0$.

Suppose one is considering whether a structure variable S increases more or less than proportionately with size. Measuring size by A ,

$$S = c + dA \quad (ii)$$

with c negative and d positive. In this case, S increases more than proportionately with size. By substituting for A from equation (i) in equation (ii), the equation for predicting S from the other measure of size E can be derived. Thus,

$$S = (c + ad) + bdE \quad (iii)$$

The sign of bd is positive, as both b and d are positive. Since the sign of c is negative, the sign of $(c + ad)$ is uncertain. If $(c + ad)$ is positive, then variable S increases less than proportionately with size measured by E . This, however, contradicts the conclusion from equation (ii) that S increases more than proportionately with size measured by A even though A and E are perfectly correlated. Clearly, this problem does not arise if the two size measures E and A are proportional to each other, in which case ad is zero.

Equation (i) was estimated using two size measures at a time to determine whether the proportionality condition was met in the present study. Since there was no *a priori* justification for using one size measure as the dependent variable and the other as the independent variable, the exercise in each case was repeated with the order of variables reversed. As is evident from Table 2, none of the intercept values is significant at the .05 level. Thus, in addition to being highly correlated, the size measures in the present sample also are proportional to each other. Consequently, the estimates of size-structure relationship are independent of the size measure used.

TABLE 2
Regressions Between Size Measures
(N = 168)

A	=	154793.180	+	7419.8430E	R	=	.882
		(<i>t</i> = .106)		(<i>t</i> = 24.060)			
E	=	224.437	+	.0001A	R	=	.882
		(<i>t</i> = 1.298)		(<i>t</i> = 24.060)			
S	=	68410.235	+	1274.7200E	R	=	.969
		(<i>t</i> = .568)		(<i>t</i> = 50.170)			
E	=	16.467	+	.0007S	R	=	.969
		(<i>t</i> = .179)		(<i>t</i> = 50.170)			
A	=	618054.410	+	6.0800S	R	=	.951
		(<i>t</i> = .643)		(<i>t</i> = 39.503)			
S	=	230810.550	+	.1490A	R	=	.951
		(<i>t</i> = 1.543)		(<i>t</i> = 39.503)			

A = assets.

E = number of employees.

S = sales.

Discussion

The results of the present study do not support Kimberly's hypothesis that size-structure relationship may vary according to the size measure used. The results indicate that both the magnitude and the form of size-structure relationship are similar across the three size measures. In each case, the relationship is found to be significant and nonlinear.

It should be noted that the present study is based on a homogeneous sample of life insurance companies. In this case, both the conditions of interchangeability among size measures (high intercorrelations and proportionality) are met. Perhaps these conditions are much less likely to be satisfied in a sample of organizations drawn from heterogeneous industries. For example, Child (1973) found a correlation of $r = .31$ between number of employees and net assets. He attributed the low value of the correlation to the fact that 27 of the 82 organizations in his study belonged to two service industries, advertising and insurance, for which the role of financial assets was not comparable with that of manufacturing concerns. When the remaining subsample of manufacturing organizations was taken separately, the correlation between numbers employed and net assets rose dramatically to $r = .86$.

A similar argument can be made in regard to the condition of proportionality among size measures. Measures of organization size, such as those used in the present study, fall in two categories: inputs and outputs. In the production process, assets and employees constitute inputs, and sales (holding inventories constant) represent output. Proportionality between inputs implies that if each input is increased by some proportion p , the output increases by some function of p , i.e., a homothetic (linear) production function. Proportionality between inputs and output requires, in addition, constant returns to scale. Even if such proportionalities between inputs and between inputs and output hold for one industry, it is highly

unlikely for the sample proportionalities to hold across industries. Variations in technology are likely to cause input ratios and input-output ratios to differ widely across industries.

Thus, the results of size-structure analysis will be independent of size measures only if the measures are highly correlated and proportional to each other. The above discussion indicates that these conditions cannot be assumed a priori, particularly in samples of organizations from widely divergent industries. Future size-structure studies based on such samples should collect data on multiple measures of size to verify comparability of results. Or, alternatively, they must state the logical reasons for selecting a particular size measure.

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THE REGIONAL HEADQUARTERS DECISION: A COMPARATIVE ANALYSIS¹

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Since World War II, multinationalism has been on the rise. Its ascent is due in large part to multinational corporations (MNCs) intent on extending their global reach. The engine of this growth has been divisionalization in product, functional, or geographical terms (Schollhammer, 1971; Franko, 1974) and, in more recent years, matrix or multidimensional paradigms (Kingdon, 1973; Galbraith, 1973; Davis, 1976). Consequently, two out of three MNCs maintain regional headquarters to supervise multiple operations in Europe, North America, Asia, or other geographic blocs.

In response to increasing corporate regionalism, enterprising cities are pursuing a parallel course of multinational accommodation (Heenan, 1977). They recognize that their future survival and growth depend in large part on their attracting the headquarters of MNCs.

This paper compares the decision making process of executives in American and Japanese MNCs in selecting regional headquarters. Key similarities and differences are presented, with implications drawn for both organizational and urban researchers.

This is a cross-sectional study based on data collected in 60 American and 47 Japanese multinational companies. These firms are among the largest 200 companies in terms of sales revenues in their respective countries. All have significant international business interests—at least 25 percent of their total sales comes from foreign operations, and all have some form of regional headquarters. A questionnaire (discussed below) was prepared and administered to a senior executive in each participating company. Participants were chief executive officers or officials who reported directly to chief executive officers. This requirement was to ensure that only high level decision makers were included in the survey. Of the target audience, 78 percent of 107 executives submitted completed questionnaires. Approximately one-third of the respondents were subsequently interviewed in such diverse locations as New York, Tokyo, Miami, Manila, and Honolulu.

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Operational Measures

Managers were asked to determine the relative importance of different variables or dimensions that they would consider in selecting a regional headquarters, irrespective of geographical area (Latin America, North America, Europe, and so on). Initially, with an open-ended questionnaire and interview technique, executives in both Japan and the United States were asked to list those items considered in making regional headquarters decisions. Eventually, 16 items or dimensions—those most often mentioned by both Americans and Japanese executives when evaluating regional headquarters sites—were incorporated in the final questionnaire. These items ranged from cost of living to the availability of office space.

Using an orthogonal array, test combinations were selected so that the independent contributions of all 16 items were balanced (Winer 1971). In this way each dimension's weight was kept separate and not confused with those of the other dimensions. Consequently, different combinations of the 16 variables were constructed and tabulated into 16 sets of 4 variables each. These tabulated sets were then presented to participants.

Data Analysis

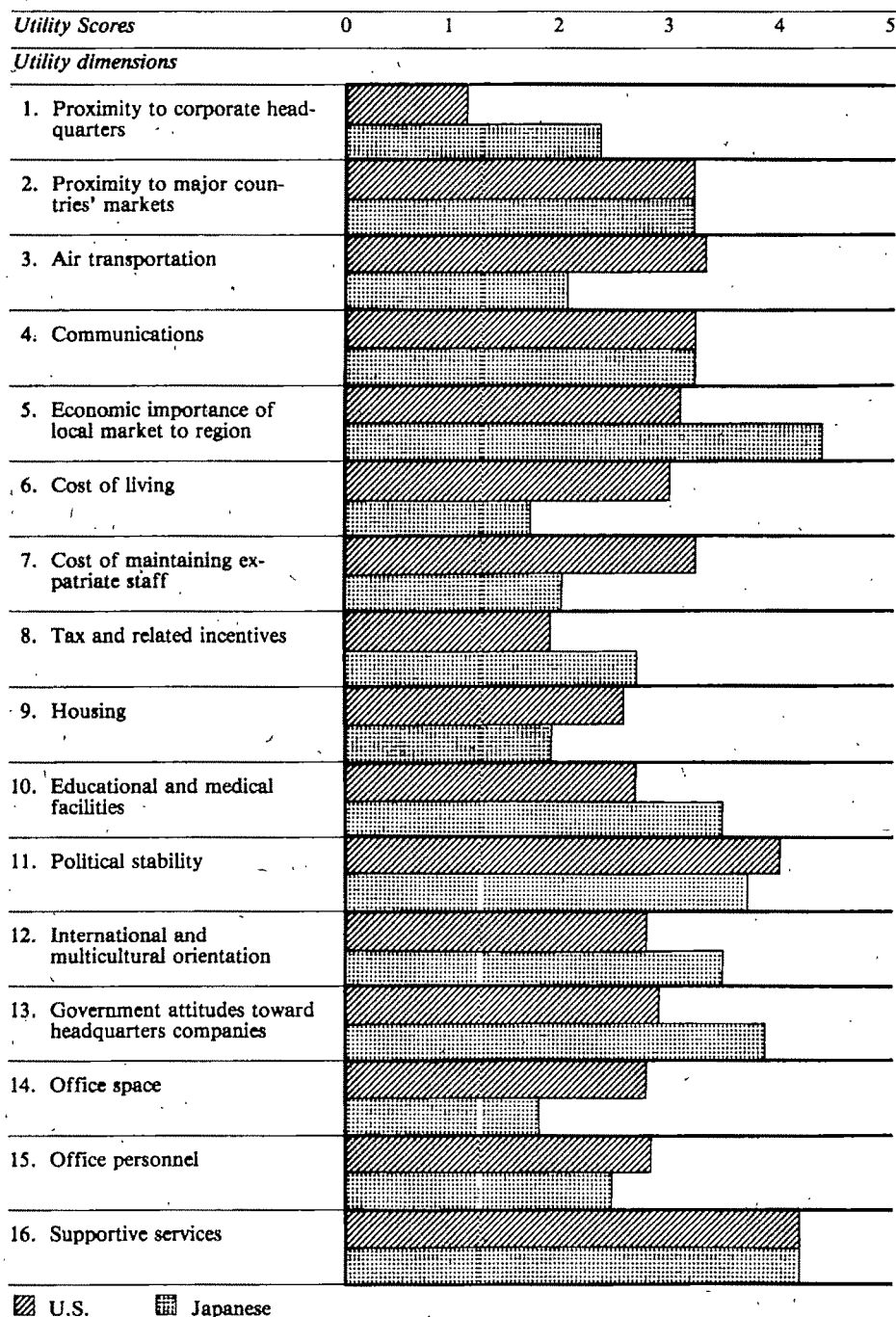
The individual subject was the unit of analysis. First, the ordering of tabulated factor preferences for American and Japanese executives provided the input to separate conjoint measurement programs using a least squares graphic analysis (Figure 1). This multivariate application derived utility scores reflecting the relative importance of each of the sixteen factors to respondents (Green & Wind, 1973). To determine the statistical

TABLE 1
Stepwise Discriminant Analysis

<i>Step Number</i>	<i>Variable Entered/Removed</i>	<i>F</i>	<i>Number of Variables Included</i>	<i>U-Statistic</i>
1	Cost of maintaining expatriate staff	14.3277*	1	.8194
2	Educational and medical facilities	10.2681*	2	.7061
3	Cost of living	8.5671*	3	.6486
4	Air transportation	5.5880*	4	.6061
5	Proximity to corporate headquarters	4.4983*	5	.5645
6	International and multicultural orientation	2.3152*	6	.5449
7	Office space	.7553	7	.5380
8	Tax and related incentives	.3785	8	.5345
9	Government attitudes toward headquarters companies	.3020	9	.5317
10	Economic importance of local market to region	.2640	10	.5292
11	Housing	.1979	11	.5273

*F-test significant at .05 level.

FIGURE 1
Dimensions Affecting the Choice of Regional Headquarters:
U.S. Versus Japanese MNCs



significance of American versus Japanese preferences for these sixteen items, stepwise discriminant analysis was used (Table 1).

Results and Discussion

As shown in Figure 1, there are noticeable similarities and differences in the preferences of American and Japanese executives regarding locational variables for regional headquarters. Most important to U.S. multinationals are a city's political stability, its supporting infrastructure, the cost of maintaining an expatriate staff, availability of air transportation, and communications. Of least concern are proximity to corporate headquarters, tax and related incentives, housing, education and medical facilities, and availability of office space and personnel. But critical to Japanese MNCs are the economic importance of the local market (where the regional headquarters would be based) to the area, its supporting services, government attitudes toward headquarters companies, educational and medical facilities, political stability, and a city's international and multicultural orientation. Least important are the cost of living, availability of office space and housing, cost to maintain an expatriate staff, air transportation, and office personnel.

Virtually identical for both national groups are their preferences regarding supportive services, communications, and the proximity of an area headquarters to major country markets in the region. (Supportive services are those facilities and amenities that satisfy some public demand, e.g., bus service. Excluded, however, from this category are those choice variables specified in the questionnaire, e.g., communications, educational and medical facilities.) General consensus also is reached on the value of political stability and the economic importance of the local market to the region. However, intergroup differences significant at the .05 level (Table 1) are shown for the following factors (in decreasing order of discrepancy): (1) cost of maintaining expatriate staff members, (2) educational and medical facilities, (3) cost of living, (4) air transportation, (5) proximity to corporate headquarters, and (6) international and multicultural orientation. Cost factors and air transportation are considerably more important to Americans than to Japanese. Japanese executives place much greater value on a global city's educational and medical facilities, its international ambiance, and its accessibility to the corporate command post in the home country.

Readily explainable is the variation in attitudes regarding costs to the firm. As a rule, corporate costs of maintaining expatriates include overseas premiums, housing allowances, cost of living differentials (from the home country), tax equalization (between home and host countries), and other somewhat less important items. Although not insignificant, these costs are written off for the most part by MNCs operating out of Japan, where permissive tax regulations treat such items as costs of doing business and, therefore, to be expensed. Not so for U.S. multinationals.

Their expatriates must treat these items as direct income, which may not be written off for tax purposes. Recent U.S. tax changes should worsen this. Consequently, expatriate costs will be much more carefully scrutinized by U.S. firms in their choice of a regional headquarters.

Similarly, cost of living weighs heavier on American companies. Consider, for example, the major corporate headquarter cities of Japanese and American MNCs. Today, Tokyo and Osaka remain the most expensive urban areas in the world. Their living costs are approximately 35 percent higher than those in New York. As a result, when Japanese executives assess alternative foreign cities for a regional headquarters with Tokyo as the benchmark, they almost surely can expect a reduction in the cost of doing business. The case is quite different for U.S. companies, now that many cities in Western Europe, Asia, and Latin America have surpassed New York in living costs.

Also explainable is the American businessmen's higher preference for satisfactory air transportation to and from a regional setting. Once a regional headquarters is established, American executives out travel their Japanese counterparts by a 2:1 margin. (This phenomenon was first observed in 1976 by Governor Ariyoshi's Committee to Make Hawaii a Regional Center. At the time of this writing, these findings remain unpublished.) Consequently, they place a much higher premium on easy access to international airports.

Not surprising is the higher value that Japanese executives afford a regional city's educational facilities. This is reinforced by their strong sentiment for an international and multicultural orientation in a headquarters setting. Respondents frequently mention their need for "things Japanese"—especially education and culture in the national tradition for their children. Their choice is the large, sophisticated metropolis with a multicultural infrastructure—hopefully including a Japanese language school. Preservation and extension of the culture, although important to Americans, are of less concern, and for good reason. The American way of life and the "English is spoken here" phenomena are omnipresent. Virtually every major city in the world nurtures some form of Americana. Thus for the immediate present, U.S. executives are not as nearly threatened by cultural deprivation in foreign capitals as are their Japanese counterparts.

Japanese respondents indicate stronger desires to locate their regional headquarters in cities close to the corporate headquarters. Much has been written about contemporary Japanese management methods and the consensus-building process of the *ringi* system (Yoshino, 1968; Kahn, 1970; Nakane, 1971).

Informal and face-to-face contact insure the system's effectiveness. Yoshino noted:

[The] organizational and physical setting must be such as to encourage regular and *face-to-face* interaction . . . The need for frequent and close contact is further reinforced by the very nature of interpersonal relationships in the Japanese cultural setting (1968, p. 195).

Moreover, Japanese executives express this need for increased frequency of organizational contact through reduced physical distance between headquarters and subsidiaries. Of course, it is impractical and unrealistic to shorten significantly the mileage between Tokyo and most regional headquarters locations. As an alternative form of cultural closure and socialization, Japanese companies more than most others rely heavily on expatriate transfers. Ethnocentrism, reflected in reserving the key regional and subsidiary positions for home country nationals, characterizes most Japanese multinationals (Johnson, 1977).

Beyond the matter of national similarities and differences in selecting regional offices, future research should be given to the matter of corporate headquarters—especially as the American shift to the suburbs and sunbelt states continues. In addition, the major determinants of organizational mobility should be examined. Perhaps more important, however, is the need for a greater body of knowledge on the multinationalization of our cities.

Far too long, researchers have focused on the physical and spacial characteristics of headquarters cities, to the exclusion of critical socioeconomic issues (Walton, 1975). New forms of multinational organization development and social architecture are needed (Heenan & Perlmutter, 1978). Only then can the human settlements of tomorrow be characterized as truly global.

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**THE IMPACT OF THE COMPUTER
ON THE CHOICE ACTIVITY OF DECISION MAKERS:
A REPLICATION WITH ACTUAL USERS OF COMPUTERIZED MIS**

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A previous study on the impact of computer generated information on the choice activity of student subjects found that those with computer experience were less influenced by computer generated information than they were by information presented in a more traditional mimeograph format. Subjects who had little, if any, computer experience were more influenced in their choice activity by computer generated information than by the identical information presented in the more traditional mimeograph format (Luthans & Koester, 1976). The results of that study seemed to have definite implications for users of computerized information systems, suggesting that computer generated information per se may bias users. Those with a great deal of computer experience may be overly skeptical of computer generated information, and those with little or no computer experience may be in awe of the computer and place too much credibility and reliance on the information that it generates. These possibilities seem sufficiently significant and intriguing to be tested in a field study with actual management information systems (MIS) users.

Computerized information is playing an increasingly significant role in all aspects of managerial decision making. Unfortunately, there is too little research evaluating its impact (e.g., Lucas, 1975; Mason & Mitroff, 1973; Schewe, 1976; Swanson, 1974). Although over two decades ago Weinwurm (1957) warned about the need for better understanding of human factors in management science, there still is very little known about important areas such as the impact that computers have on human decision making (Tomeski, 1976). On the one hand, some computer experts are making the plea that "The computer must *support* the manager but not *replace* his judgment. It should not try to provide the 'answer,' not impose a predefined sequence of analysis" (Keen, 1976, p. 2). Yet the laboratory study suggested that those users with little computer expertise may actually be letting the computer make the decisions for them. It is the syndrome that says: "If the computer says this is the answer, then it must be right. Who am I to question the big, blinking, magical box?" On the other hand, there is some evidence that humans are not as effective as are computers in making decisions (e.g., Dawes, 1973). Based on this, the

argument becomes: "Essentially a man should 'tell' the computer *how* he wants decisions made, and then let the machine make the decision for him" (Zeleny, 1975, p. 38). From this latter perspective, the laboratory study suggests that those with a great deal of computer expertise may be underselling the value of the computer in making decisions.

In either case, a replication with actual users as subjects should be able to shed important new light on the impact that computers have on the managerial decision making process. In addition, the present study represents the orderly progression of scientific inquiry by moving from the laboratory to the field setting in the search for generalizability and the more effective practice of management.

Background and Subjects

The present study utilized members of the professional finance and accounting staff of the production division of a large oil company. This company has one of the largest concentrations ($N = 450$) of practicing accountants in the country. It contains one of the most sophisticated non-military computerized information systems in the world. Within the last decade this division has experienced two major mergers so that most of the present staff have a wide range of experience with three large petroleum companies.

The accountants are invited to attend monthly technical, professional meetings sponsored by the company. The day the study was conducted, 220 accountants attended the meeting. This represented the biggest turnout in the 18 months the program was in effect. All but 17 of the accountants (they participated in the planning and/or administration of the study) took part in the study ($N = 203$).

Virtually all the subjects are heavy users of the computerized information system. They retrieve, manipulate, and display information from the computerized system on a daily basis, although some are more experienced, especially in the input/programming and system development aspects, than are others. Because previous computer experience had such an important moderating effect in the original study by the present authors, the subjects were classified as experienced or nonexperienced. In consultation with the appropriate company representatives three questions were developed to determine the degree of computer experience: (1) Have you ever attended the in-house computer programming school? (2) Do you have six months or more of programming experience in any of the languages? (3) Have you ever served as the primary user representative in the development of a computer system? Subjects who answered yes to one or more of these three questions were classified as computer experienced. If all three questions were answered no, the subjects were classified as nonexperienced. During the data analysis phase of the study the subjects were assigned to the experienced and nonexperienced experimental groups according to these criteria.

Procedure

All subjects were led to believe that they were participating in a study to determine their aptitude for the analysis and utilization of various kinds of data. They then were given a packet of materials and were told to follow instructions carefully. They were warned not to turn to any page in the packet until told to do so. Then they were asked to fill out the first page which asked for their name and various biographical information. Included were several items designed to stimulate the competitiveness and interest of the subjects. For example, subjects were asked to identify their organization unit, immediate supervisor, and the college from which they were graduated. (This latter point was deemed to be significant because the majority of the company's accountants came from a concentration of regional, highly competitive universities.) The first page also contained items to determine the degree of experience the subjects had with the computer.

After filling out the first page, the subjects were told that they would be taking a 10 minute, 20-item multiple choice test. They were told that it was a difficult test, but there was no penalty for guessing. They were told to answer all questions, to keep their answers to themselves, and not to look at the remaining materials in the packet until told to do so. This multiple choice examination consisted of 10 aptitude-type questions. Two dealt with general logic, two with vocabulary, one with spelling, two with general mathematical exercises, and two with numerical progressions. There was one general information question. Five of the questions dealt with technical aspects of finance and accounting. The remaining five consisted of a tax question, a question on the security and exchange commission, and three questions on internal company data. The key aspect of this test is that there is no one best answer. Of the 20 questions, 14 list possible answers, all of which are incorrect, and the remaining 6 questions list possible answers, all of which are correct. The role of this test is essentially that of a placebo. This procedure is commonly used in all projective instrumentation in personality analysis and in the use of many no-answer tests in creativity research. The objective was to prohibit the test items per se from influencing the subject's choice activity. Therefore, each item was carefully designed and pilot tested. Examples of a couple of the questions are:

What is the next number in the progression 17, 12, 43, 22? (a) 6 (b) 95 (c) 30 (d) 29.

Differential calculus is to integral calculus as algebra is to: (a) factor analysis (b) exponentiation (c) probability theory (d) derivative extraction.

As the above indicates, these questions were very difficult, and post-study interviews with participants indicated that they did not suspect that there was no one best answer.

After completing the 20-item test, the subjects were told that, because the test was so difficult, they would have a five minute review period in which they could change answers if they so desired. They were told to turn to the last two pages of their packet for this review.

When the packets were randomly passed out to the subjects, in about 30 percent of the packets the last two pages contained irrelevant data from the company's annual report. The subjects receiving the latter packets became the control subjects. They received no suggested answers to the exam. During the data analysis phase of the study, when it could be determined from the first page of the packet what the subjects' experience with the computer had been, there turned out to be 31 in the computer experienced control group and 30 in the nonexperienced control group. The remainder of the packets that were handed out contained a last page that had either a computer printout list of suggested answers or a mimeograph list of suggested answers. When assigned according to the experience criteria, the four experimental groups were as follows:

Experimental Group I ($N = 29$). Computer experienced subjects were given the same page (the page following the twenty-question exam in the packet) of irrelevant data as was received by the control subjects, but a last page having a computer *printout* list of suggested answers.

Experimental Group II ($N = 28$). Computer experienced subjects were given the same page of irrelevant data as received by the control subjects, but a last page having a standard *mimeographed* list of suggested answers.

Experimental Group III ($N = 46$). Nonexperienced subjects were given the same page of irrelevant data as received by the control subjects, but a last page having a computer *printout* list of suggested answers.

Experimental Group IV ($N = 39$). Nonexperienced subjects were given the same page of irrelevant data as received by the control subjects, but a last page having a standard *mimeographed* list of suggested answers.

All subjects were told that they could change as many answers as they desired during the review period. They were told that the two additional pages of information for the review session were generated from a variety of sources and may or may not be correct. This also was stated at the top of the last page for the experimental subjects. Because there was no single best answer to the questions on the test, there also was no single best answer suggested by the answer lists given to the experimental subjects. For example, the answer listed corresponding to each question stated that, "THE ANSWER TO QUESTION 1 is E," etc. These suggested answers were randomly assigned on the lists. In other words, the suggested answers were not the key, but rather the key was the type of format (i.e., mimeograph or computer printout) on which the suggested answers were presented. The suggested answers for the printout subjects were printed by the computer on regular computer printout paper. The suggested answers for the mimeograph subjects were mimeographed on standard white paper. The two lists of answers were identical in every other respect (content, size, form, capitalization, punctuation, spacing, and quality of paper).

The answer sheet used by the subjects contained two columns. The subjects were instructed to place their answers to the questions during the regular time period in column A and during the review period to place any answers they wished to change in column B. Thus, the exact number of changes could be accurately recorded.

Results and Conclusions

The mean number of answer changes during the review sessions by members of each of the six groups (two control and four experimental) is summarized in Table 1. Analysis of variance found a statistically significant difference between each of the subgroups (control, printout, and mimeograph) *within* each of the two major classifications (experienced and nonexperienced). [$F(2, 85) = 4.18, p < .05$ for the computer experienced group, and $F(2, 112) = 3.84, p < .05$ for the nonexperienced group.]

TABLE 1
Number of Changes in Answers for Computer
Experienced and Nonexperienced Subjects

Group	N	Mean Number of Changes	Standard Deviation
Experienced			
Control	31	0.419	0.84
Printout	29	1.483	2.16
Mimeograph	28	2.679	4.53
Nonexperienced			
Control	30	0.333	0.83
Printout	46	1.783	2.88
Mimeograph	39	1.487	2.16

Other than the analysis of variance within the two major classifications, no significant difference [$t(59) = .396$] at any acceptable alpha level was found between the means of the experienced and nonexperienced control groups. This result is evidence of the homogeneity of the subjects in the study. In addition, because both control groups had mean changes that were significantly smaller than the means of either the printout or mimeograph experimental groups, the lists of suggested answers does seem to have had a significant influence on the choices of the subjects.

As was found in the original laboratory study, the key finding of this replication is that highly experienced computer users are less influenced by information that is computer generated than they are by information presented in mimeograph form, and relatively inexperienced computer users are more influenced by computer generated information than they are by identical information presented in mimeograph form. The mimeograph group of computer experienced users changed significantly more answers than did the computer-experienced printout group. The reverse

was true of the relatively nonexperienced users. The printout group of nonexperienced users changed significantly more answers than did the mimeograph group of relatively nonexperienced users.

The implications that the original study had for actual users of computerized information systems were supported by this replication. The choice activities of actual users of MIS seemed to be affected by the computer per se. Also similar to the original study was the type of impact the computer had on the subjects. As in the first study, those users with relatively little computer knowledge, background, or experience were more influenced by the computer than they were by more traditional forms of information. A case could be made that those who know nothing about the computer may try to put it down and discount the data that are computer generated. An example may be a judge who has no computer experience and may discredit evidence that is computer generated. In today's organizations, however, most managers realize the growing importance of computers. The stereotyped version of the manager with no computer experience holding the computer in awe and being overly influenced by it seemed to be the case in this study. The results would suggest that users with little computer background should recognize and be cautioned that computer generated information is not necessarily equal to or superior to more traditional forms of information. By the same token, the finding that the computer experienced users may be overly pessimistic about computer generated data also has implications for practice. Some writers on systems analysis already have suggested that they have falsely assumed that past experiences with the computer have been pleasant and productive (Gibson, 1977). This study would indicate that this is true. Knowledgeable, experienced users were not as influenced by computer generated information as they were by more traditional forms of data. These knowledgeable users should recognize that they may be unfairly biased against the computer. They should recognize that their past experience may affect their present judgment in using computerized information systems. In either case, with the increasing use of MIS, the users themselves, as well as their peers, superiors, and subordinates, should be aware that the computer per se may influence the decision making process.

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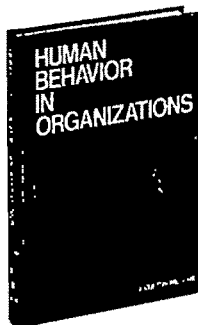
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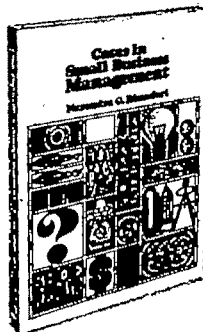
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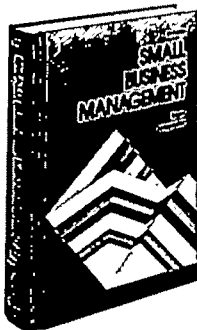
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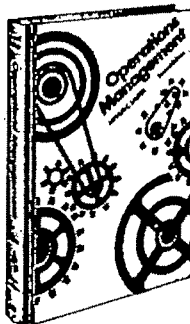
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Issues in the Creation of Organizations: Initiation, Innovation, and Institutionalization¹

JOHN R. KIMBERLY
Yale University

This paper summarizes some of the most important findings of a longitudinal study of the birth and early development of an innovative organization. Paradoxically, those features of the organization that led to its success as an innovation in the short run were incompatible with requirements for survival in the longer run. These findings underscore the advantages of a biographical approach to organizational analysis.

What makes some organizations more successful than others? This question, implicitly or explicitly, is part of most research on organizations and management. Obviously there are both practical and theoretical reasons for the salience of the issue. Managers are concerned with increasing the success of their organizations—and hence their own careers. To the extent that research can contribute to that end, it is welcomed and supported by them. The early history of organizational research, in fact, suggests that its origins were stimulated as much by the needs and concerns of industry as by those of researchers. Researchers, on the other hand, have recognized the importance of differing levels of success as a dependent variable in the study of organizational behavior and have devoted much time and energy to attempting to understand both its correlates and determinants.

The measurement of success, or effectiveness, has been problematic. (The terms “success” and “effectiveness” are used interchangeably in this paper, although it is recognized that there are theoretical debates about the appropriateness of doing so.) It is generally agreed that success is

¹This paper is revised from that presented at the joint EIASM/Dansk Management Center Seminar on Entrepreneurs and the Process of Institution Building, Copenhagen, May 1976. It was originally written while the author was a Research Fellow at the Centre de Recherche en Gestion, Ecole Polytechnique, Paris. The support of the Centre is gratefully acknowledged.

multidimensional, but there has been little consensus as to its components (Steers, 1975; Goodman & Pennings, 1977). Survival is one criterion that most researchers agree is a necessary, albeit not sufficient, condition for success. (It is not even clear that survival is always a criterion for success. Organizations that are truly effective may put themselves out of business, in which case death is the ultimate criterion for success.) There is less agreement about other dimensions, however, and many managers themselves are hard pressed to justify traditional measures and to suggest viable alternatives. And when the focus shifts from industrial to nonindustrial, or "people-processing" organizations, the problem of defining success or effectiveness is exacerbated (Kimberly, 1980). What distinguishes a successful from a less successful prison, or mental hospital, or educational institution? Debates over appropriate criteria are intense, and few widely accepted ones have been developed.

One very real problem in research on organizations, then, has been determining what success is. This problem, however, does not appear to be insoluble, and researchers have made progress (Mahoney & Weitzel, 1969; Price, 1968; Yuchtman & Seashore, 1967). The most comprehensive statement of the current state of the art in conceptualizing and measuring effectiveness and of the problems that remain is found in the collection of papers edited by Goodman and Pennings (1977).

The present paper is framed around an issue in the analysis of effectiveness that has received little attention but that has important implications—a sampling and research strategy issue. Most research on the question has been carried out in mature organizations that have existing structures, domains, control systems, and normative codes and has been based on cross-sectional designs. This means that the perspective is usually static. Overlooked is the possible relevance of the organization's stage in its life cycle (Kimberly, 1976a).

Researchers tend not to be involved with the organization except for a brief period at some, usually unspecified, point during its life. As a result, the implications that the conditions surrounding the organization's birth and early development may have for levels of success or effectiveness later on are not considered. There is the possibility, at least, that, just as for a child, the conditions under which an organization is born and the course of its development in infancy have nontrivial consequences for its later life. Just as one might be interested in similarities and differences in the backgrounds of executives as one important element in an explanation of their personal success, so might one be interested in the backgrounds of organizations. It is not argued that the analogy is perfect by any means, only that it raises a question about the analysis of organizational effectiveness that has not been pursued to any great extent in the literature.

This paper analyzes the question of effectiveness in the context of the birth and early development of an innovative organization. In so doing, it directly confronts the sampling and research design issue noted above. The organization studied is not "mature," and the analysis is not cross-

sectional. It is a case study, and thus the usual caveats are in order. As Cummings (1977) has argued, however, intensive longitudinal analysis of individual cases is likely to enrich one's perspectives on organizations and lead to theoretically more interesting conceptualizations of effectiveness and its etiology.

Three separate but related bodies of literature—apart from that on effectiveness—have influenced the development of the paper. First is the literature on organizational innovation, much of which has been summarized in Rogers and Shoemaker (1971), Zaltman, Duncan, and Holbek (1973), and Kimberly (1980). This literature highlights the effects of both internal and external factors on the fate of innovation. Second is the literature on organizational environments. The importance of this research, the leading edge of which is contained in the volumes by Meyer and his associates (1978), by Pfeffer and Salancik (1978), and by Aldrich (1979), is to demonstrate that both organizational process and outcomes are influenced strongly by environmental factors; factors which may be only partially within the control of any single organization. Finally, research on organizational growth and development, summarized and extended by Starbuck (1965, 1971), suggests that growth and development are not linear processes and may be influenced by a variety of political, economic, and social factors. The analysis presented in the following pages owes much to these literatures even as it attempts to move in some new directions.

SETTING AND RESEARCH DESIGN

New organizations are being created continuously in both the private and public sectors. Very little data exist regarding the rates of foundation of new organizations, although one has the impression that the rates are high. One also has the impression that the rates are higher in the private sector than in the public sector, although the rate of growth of government as an employer in recent years has risen rapidly, while that for industry has leveled off considerably. Whether this is indicative of a shift in rates of foundation of new organizations is unknown. All that can be said with certainty is that rates of organizational birth are nontrivial in both sectors.

The organizational subject of this paper is a new school of medical education, which opened its doors to its first class of students in September 1971. At that time there were 86 other medical schools in the United States. The majority of these schools were very similar in terms of both organizational structure and content of curricula. They all were four-year programs in which the first two years consisted of basic science training (biochemistry, physiology, etc.) and the final two were spent in clinical training (direct contact with patients in the hospital setting). With very few exceptions, the basic science curricula were discipline-oriented, lecture-laboratory experiences taught by Ph.D.s in the particular disciplines. The students had no contact with patients during this time.

Whether the remarkable similarity among the schools of medicine can be accounted for by the Stinchcombe (1965) hypothesis about structural stability and date of founding and/or by the widespread impact of the Flexner Report on the state of medical education in the United States at the beginning of this century, is debatable. The new school, however, was different. Its structure and curriculum departed significantly from the norm. It thus faced not only those problems that any new organization might be likely to confront, what Stinchcombe (1965) has called the "liability of newness," but also problems of being different. Being both new and different proved to be both an advantage and a disadvantage, as will be demonstrated later.

The observations that form the basis for the present paper were made during the application of a "process research" design for evaluating the birth, development, and impact of the new school. This approach, which has been described in detail elsewhere (Kimberly, Counte, & Dickinson, 1972), was based on the belief that significant learning about organizational phenomena can result from intensive longitudinal analysis of organizational processes.

The researcher was a faculty member in a social science department on the campus where the medical school was started. He was contacted by the dean of the new school during the spring of the year prior to its formal opening. The dean was interested in a social science oriented appraisal of his program by an outsider and was willing to provide a modest amount of seed money to help launch such an effort. The researcher was interested in the opportunity to get in on the ground floor of the birth of an organization, to develop a longitudinal study, and to conduct research on organizational behavior in a nonindustrial setting. An understanding was reached in which the dean agreed to provide access to those data sources defined as relevant by the researcher and the researcher agreed to share observations and findings with the dean on a regular basis.

The research effort extended over a four year period, with funding obtained from a number of federal and state sources. The data collection strategy involved a variety of survey, interview, observational, and archival research techniques. Data collected systematically from community physicians, students, faculty, and administrators at multiple points in time were combined with data from conversations, observations made both formally and informally in and around the school, minutes from a variety of different kinds of meetings, and memoranda of all sorts to form a rich store of information. In addition to learning a great deal about organizational behavior, much was learned about the problems and opportunities associated with the process research approach to the assessment of organizations (Kimberly & Nielsen, 1977).

The observations and interpretations presented in the present paper represent an effort to stand back from the specifics of the data that were collected and to piece together a more general mosaic based on, but not directly tied to, those data. It is an effort to understand some important

things about the context in which the questions of birth and effectiveness were explored and to extract their implications for organizational theory and research.

Any new organization faces two general problems, and the analysis of the birth and early development of the school deals with both. First is the problem of getting off the ground. Here the origins of the school are considered and the conditions of its birth described. Second is the problem of institutionalization. Once off the ground, organizations must develop strategies for longer run survival and growth, strategies that basically involve, following Thompson's (1967) lead, sealing off their core technologies from the effects of environmental uncertainty. In this area, problems the school faced as it grew are discussed and what is here called the "paradoxical nature of success" is described.

BIRTH OF THE SCHOOL

The birth of any organization is affected by a complex set of political, economic, social, and psychological factors. It is beyond the scope of this paper to deal systematically with all of these. Instead, the analysis will take into account what, on the basis of careful observation, are felt to be the two most important sets of factors involved in the birth of the new medical school: (1) the situational constraints favoring its emergence at a particular point in history and (2) the ambition and vision of its first dean, which were largely responsible for defining the particular shape the school took and the directions it followed.

Situational Constraints

There was a particular mix of social, economic, and political factors existing in the late 1960s and early 1970s that together created a favorable climate for the founding of a new medical school. For purposes of analysis, it is convenient to adopt Hall's (1972) distinction between general and specific environmental conditions and to distinguish between concerns at the national level—general environmental conditions—and those at the state and local levels—specific environmental conditions.

On the national level in the middle and late sixties there was an increasing concern with the adequacy of existing supplies of physicians. Although there was much debate about whether a shortage of doctors did, in fact, exist, the federal government was persuaded and developed a number of policies designed to increase the production of new doctors. Particularly influential was its decision to make federal monies available to medical schools on a capitation basis, thus encouraging the schools themselves to admit and graduate increasing numbers of students. Money also became available from the federal government and a number of private foundations to help finance the establishment of new schools. Thus, the national mood favored the establishment of new medical schools at this time, and this mood was reinforced by the availability of resources.

During this period there also was a national debate within the community of medical educators about the viability of traditional structures of medical education. This debate was influenced, of course, by the more general issues of the era related to education in general and higher education in particular. Traditional values and structures were being called into question, and cries for reform came from many sources. Students were demanding more "relevance" in their education and a greater voice in determining the form and content of the educational process. The utility of grading systems was called into question, and there was much experimentation with pass-fail systems and ungraded courses. Faculties were reexamining basic assumptions of their own careers, and much of the initiative for reform came from them. Medical education was not immune from these debates, in spite of the generally conservative character of most medical schools. Criticisms of the existing system abounded. It was argued that traditional structure with its lockstep approach was one in which time (four years) was the constant and learning was the variable. It also was argued that the two years of basic science had negative effects on student motivation because it was simply more of what they had experienced as undergraduates in college. Not being able to see patients until their third year of medical school, it was argued, did not enable students to see the relevance of the basic sciences for the practice of medicine. The strong explicit and implicit emphasis on specialization as opposed to general practice resulted in pressures on most students not to consider general practice seriously as a career alternative. The socialization process in medical school, in other words, was a major contributor to the oft-cited imbalance between specialists and general practitioners on a national basis.

These two factors, increasing the supply of doctors as a national priority and widespread questioning of some of the basic assumptions and structures of medical education, provided a conducive general environmental climate for the founding of new medical schools.

Other things were happening on the state and local levels, in the specific environment, to favor the establishment of a new medical school. The University College of Medicine, headquartered in a major metropolitan area, had long been one of the largest medical schools in the country as measured by the number of doctors per year it graduated. It was the unchallenged leader in medical education in the state. Doctors and politicians in other parts of the state, however, for some time had felt that it cast an uncomfortably long shadow over medicine in the rest of the state, and they looked on developments nationally as an opportunity to initiate medical education programs outside the metropolis. Accordingly, there was a move to establish a new medical school in the state capital. Not to be outdone, the University College of Medicine proposed a substantial growth program of its own, which involved establishing semiautonomous branches in three other cities as well as increasing its own capacity at home. The existence of a campus of the University with a number of distinguished basic science departments, three hospitals, and a sizable

medical community in another city made that city a logical site for one of the three branches. There also was a good deal of concern among policy-makers at the state level over the large number of state-trained doctors who were leaving the state to practice elsewhere. The major urban area was not affected by this exodus, but the rest of the state was. Some hope was expressed, therefore, that by establishing branches outside that area, students would be exposed to the practice of medicine in nonurban settings and thus would be more inclined to locate in those settings once their training had been completed.

For its part, the campus of the University that was the potential site of the new school looked on the possibility of a medical program with mixed emotions. It was clearly attractive in the short run, as a new medical school undoubtedly would help generate other new resources. By the late sixties it was evident that the days of abundant resources and rapid growth were gone. The longer run was less clear, and there was considerable uncertainty about how the administrative linkages with the College of Medicine could be established on the most favorable of terms. In the end, however, the advocates of potential overcame the proponents of caution, and it was agreed that one of the branches would be established there.

Role of Entrepreneurship

A number of forces combined at a particular point in time to lead to the decision to establish a new medical school in the particular locale. An understanding of these forces alone, however, is not sufficient for an understanding of the kind of school that was established and the course of its early development. For this it is necessary to look carefully at the ambitions and character of the individual who was hired as the school's first dean.

There is considerable controversy among organizational theorists about the advisability of attributing organizational outcomes to the particular characteristics of particular individuals. Sociologists label such attribution psychological reductionism. They argue that organizational analysis is most fruitfully pursued apart from considerations of individual personalities and motivations. This position perhaps has been most forcefully argued by Perrow (1970) in his critique of the leadership approach to organizational analysis. He contends that a structural approach is more useful. In the development of the medical school reported here however, one may conclude that Perrow's position needs to be emended. In this case an understanding of the entrepreneur and his values and objectives is necessary for an understanding of the school he developed. Purely structural explanations are inadequate. Whether this would be as true in the case of the birth of other organizations is uncertain, but it is likely that were enough research available on organizational birth, it would be found that the role of the early leaders was critical. Sarason's (1972) work on the creation of new settings tends to substantiate this view. As an organization

matures, develops norms and acquires a history and identity, the importance of the person at the top diminishes in explaining organizational outcomes. Organizational mechanisms are designed to remove the equivocality that attaches to individual personalities. Thus, Perrow may be right insofar as mature organizations are concerned, but is less right where the interest is in brand new ones.

The new dean, a cardiologist by training, was in full time private practice and a clinical assistant professor at a leading medical school when he was hired. He thus came to his job from an environment that encouraged innovation. He had had limited administrative experience, however, having served five years on the Board of Education in the city where he practiced and having founded and served on the executive committee of a prepaid group practice in the same city. His hiring thus represented a certain amount of risk both for the University and for him.

Five things about the man help to explain the nature of his influence on early development of the school. First, he had a deep-rooted dissatisfaction with traditional forms of medical education and a very real commitment to the importance of developing new structures. Second, he was a risk-taker, willing to experiment with new ideas in an often uncritical fashion. Third, he was a man of action as opposed to a man of reflection and was given to making very quick decisions. Fourth, he was an idea man as opposed to a detail man, ready to paint scenarios for the future in very broad strokes, leaving his staff—often unprepared—to fill in the blanks. Finally, he was an optimist with very strong instincts for self-preservation and quickly learned the often intricate rules of survival in the highly political and politicized university environment.

He came to the position with a budget and an associate dean. The school he developed was, in a very real sense, his school. At the outset it represented in concrete terms his vision of what medical education should be. In the beginning he was reacting instinctively and intuitively, and what he did—and what he did not do—had important consequences for the early life of the school. The major constraint imposed from without was that the school was to start out as a one year basic science program. The intention was then to send students to one of the other three campuses of the College of Medicine for the three years of clinical training that were to follow. Another, initially latent, constraint was that the school serve two administrative masters, the College of Medicine located in another city and the University campus. As long as the school was small and neither commanded nor demanded large amount of resources, it posed little threat, and the dean had a good deal of freedom to design the kind of program he wanted. As soon as it began to increase its visibility, however, the administrative constraints were activated, and they played an important role in the school's development.

The dean's first commitment was to generate enthusiasm for the medical school in the medical community. This commitment was the direct result of his vision of what the program should do—expose new

students to patients from the outset. He felt that this would enhance their motivation and would help demonstrate the relevance of the basic sciences to the practice of medicine. To do this, however, it was necessary to find doctors willing to work with the students, and the dean turned to the medical community for help. His view was that community physicians represent an untapped resource for medical education. If they could be persuaded to participate in his program, not only would they provide important learning experiences for the students, but in turn they might be motivated by their contact with the students to keep up with current developments in medicine themselves. Also, if they would participate on an unsalaried basis, the result would be considerable cost-effectiveness for the school. The inducement for participation was the status accompanying the title of clinical associate at the medical school. Thus, the dean's major initial investment was in the community, an investment which initially was to have positive payoffs in terms of physician response but which had certain costs as well because of lack of attention to the importance of campus-based bridges.

Development of the curriculum was influenced by the dean's views about learning medicine. He had strong feelings that (a) students do not all learn at the same rate and (b) that it made more sense from the perspective of medical practice to take a disease system approach rather than a discipline-centered curriculum. He also felt that he could reasonably devise a one-year basic science program to supplant the usual two-year one.

The program was designed to start small, with 16 students in the first year. The number was to double each of the next three years until the class size was 128, the target figure. Five faculty members were hired on the basis of their interest in the innovative character of the program and became involved in curriculum design. The curriculum was to consist of a number of disease-centered problems. Each student was to be assigned to a community physician who would act as an advisor, expose the student to patients, and let the student see individuals afflicted with the particular problem the student was currently studying. Progress was to be evaluated by another community physician who would examine the student orally. The role of the faculty was to provide advice, expertise, and counseling as the students felt they needed it. This medical school was one of the first to break from the traditional structure of medical education and move in some new directions.

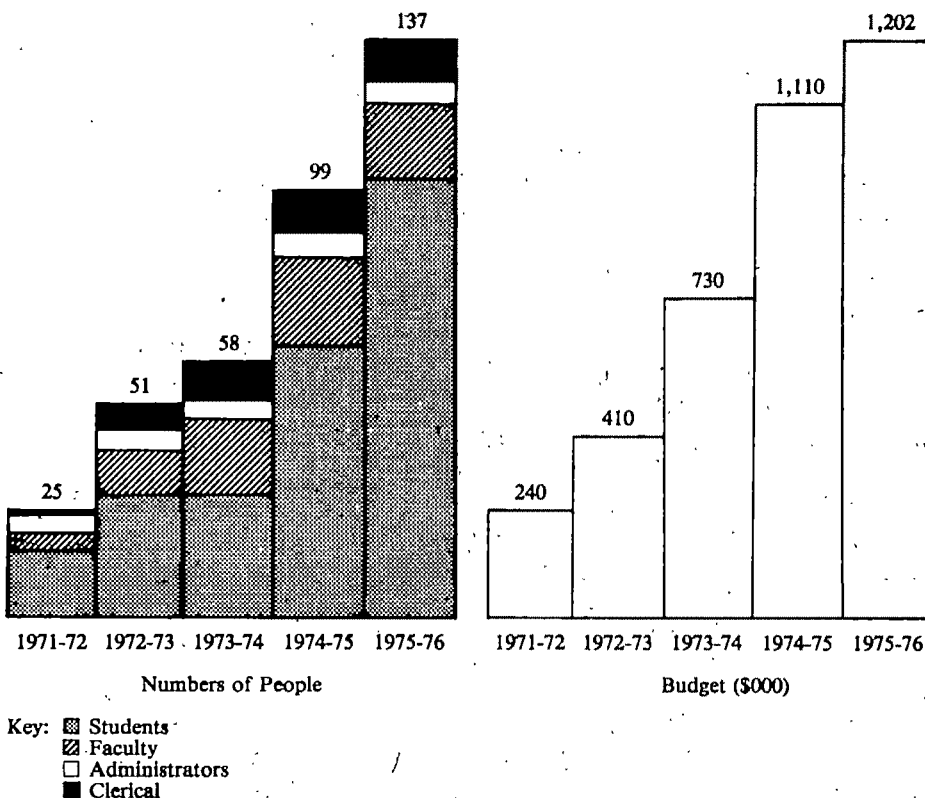
When the school opened its doors, it was modest in size. It consisted of the dean, an associate dean, an assistant dean, an executive secretary, two secretaries, five faculty members, sixteen students, commitments from over 100 physicians in the local community to participate if called upon, a curriculum which was not fully developed, and a structure which departed substantially from that of most basic science medical programs. The dean had an enormous capacity for work, and often put in 16-18 hour days. The results were impressive. He managed to develop a high degree of

credibility in the local medical community in a very short period of time. In fact, in a study of factors affecting their willingness to participate in the new program, it was found that the local physicians most frequently cited the influence of the dean as singularly important (Counte & Kimberly, 1974). He also was able to begin to build a reputation for the innovative nature of the school both in the state (Sorlie, Bloomfield, Gamble, & Anderson, 1971) and nationally (Bloomfield, Gamble, Sorlie, & Anderson, 1972).

Growth

Rapid growth is often equated with success. There is a value embedded deeply in our culture that places a strong positive evaluation on evidence of growth, and a negative evaluation on steady state and, particularly, on decline. Although recent stringencies in the general environment have forced many institutions, including higher education, to reconsider the relevance of this value, in the early days of the medical school the value

FIGURE 1
Early Growth, New Medical School



was still occupying center stage. At that point, one way both members of the organization and its external constituencies evaluated performance was on the basis of growth. Use of growth as a criterion for success has persisted, even in the face of evidence that it may not be *the* or even a major factor.

Defined in terms of growth, the initial success of the school is readily apparent. As can be seen in Figure 1, numbers of students, faculty, administrators, and support personnel and the total budget expanded rapidly in the period from 1971-72 to 1975-76. In addition, a new building to house the school opened in the spring of 1975.

Available evidence indicated that the school's innovative curriculum was favorably received by the students and that they performed as well as their peers in other basic science programs in the College on standard year-end exams. Thus it appeared that the school was doing both good and well at the same time. It was an institution whose time had come, headed by a man of ambition and vision, and this combination spawned an organization that conceivably could serve as a model for others to follow. Situational constraints and an entrepreneurial dean together had given birth to an organization that gave every indication of being highly successful.

INSTITUTIONALIZATION

Does success breed success? This question is often asked, but observation of the case of the new medical school suggests that it may not be the right one to ask. Success, as noted earlier, is multifaceted, and in the case of the medical school the composition of success changed as the process of institutionalization unfolded. For a variety of reasons, which are described below, the early success of the organization as an innovation was difficult to sustain as the organization developed. The very reasons it was successful as an innovation were incompatible with what was needed to be successful in the long run. Paradoxically, those things that accounted for its early success were among those things that had to be changed to insure its long run success. The nature of the paradox is explained by the nature of the process of institutionalization. The question of success breeding success vastly oversimplifies the realities of organizational evolution.

Institutionalization is the process whereby new norms, values, and structures become incorporated within the framework of existing patterns of norms, values, and structures. This process is one that lends stability and predictability to social relationships and enables them to persist. It is especially visible in the context of formal organizations, where a frequent problem is one of developing mechanisms to sustain planned change efforts (Goodman & Bazerman, 1979).

In the case of the medical school, the process was highly visible in the context of dealing with three problems in particular. The problems of internal social control, of the structure of work, and of managing relationships with the environment are faced by all organizations (Kimberly,

1976b). As an organization is born and begins to develop, the process of institutionalization is inevitably joined in each of these areas. The organization seeks to increase the predictability of its own outcomes and, at the same time, organizations and institutions in its environment attempt to increase the predictability of its outcomes for them. Assessments of performance are both internal and external (Pfeffer, 1977). To trace the process of institutionalization and its effects, therefore, one must look both inside and outside the organization.

A complete description of the process by which the new medical school dealt with these problems is beyond the scope of this paper. What will be presented instead is an example illustrating the nature of the response to each of the three problems. These illustrations then can serve as the basis for some more general observations.

Internal Social Control

The school's first year of existence was characterized by an atmosphere of experimentation and tolerance of each other's mistakes on the part of all of the participants—students, administrators, faculty, and local physicians. The interest of each group in seeing the school get off the ground meant that there were important degrees of freedom for everyone. The dean had been successful, for example, in enlisting the active participation of 20 local physicians on a nonsalaried basis, getting them to agree to spend at least four hours per week with their student advisees. He had been less successful, however, in defining precisely what should happen during the time they spent with their advisees, because he and his staff had not had enough time to work on that problem and because he did not have a very specific vision of what should occur. Although the physicians often felt that they were in the dark regarding what they were supposed to be doing with their advisees, they were willing to continue through the year because it was important to them to have a medical school in the community. The dean made several efforts to reassure them personally, through phone conversations and meetings, that they were doing well and that a clearer set of guidelines for their role would be provided as experience with the new format was gained.

The first 16 students also lived in an atmosphere of uncertainty. The curriculum was not fully developed, facilities were crude, there were few guidelines for their behavior, and it was difficult for them to judge how well they were doing in the program. The dean and his staff spent a great deal of time with the students during the year, fostering a sense of comradery and building up enough social capital to offset concerns about the lack of structure in the program itself. The students, in fact, responded positively to the program during the first year. Internal social control, then, was established and maintained during the early stages of development on an effective, personalized basis. The dean devoted an enormous amount of time to pattern maintenance activities, maintaining an open

door policy, and encouraging interaction. This provided much needed support and encouragement to both physicians and students.

Two things happened to change the basis of internal social control from a highly personal to a highly impersonal one. The number of students increased and other administrative demands reduced the amount of time the dean could spend interacting with students and physicians. As the number of students increased over the next years from 16 to 100, the dean hired people to perform the important linking role between the school and the local physicians and between the school and the students. But, whereas in the first year the program had been the dean, over time the program became the school. The metaphor changed from personal to impersonal, with consequent effects on the reactions of both physicians and students. Both groups were more willing to challenge and less willing to tolerate errors. The less time the dean spent with them, the more true this became. Thus, structural differentiation—the hiring of staff to perform tasks formerly performed by the dean—had the effect of producing a more highly bureaucratized system, a system which had a conservative impact on the initially innovative character of the school.

Structural differentiation did not occur solely in response to the increasing numbers of students. It also reflected changing administrative demands on the dean. In the first year he could focus primarily on problems of internal social control, but in ensuing years he had to devote increasing amounts of his time and energy to the structure of work and particularly to managing relations with the environment. These demands were independent of changes in size, and reflect, perhaps, an important aspect of the process of institutionalization. It is not a linear process, and it is not one that involves a particular sequence. The dean could have made different decisions about how to spend his time during the first year and the years following and attended to the three problems in any number of sequences and combinations. Ultimately, however, all of them had to be dealt with. The result of structural differentiation as a response to the problem of internal social control was that the dean was able to devote his energies to other areas, and in that sense it represented an effective response. The cost, however, was a diminution of the initially organic relationship between the dean, the faculty, the students, and the local physicians. There thus was less tolerance for experimentation and error and hence less willingness to accept the uncertainty that inevitably accompanies innovation.

Structure of Work

One of the explicit objectives of the dean was to create a medical school in which the students would be able to pace themselves, to learn at their own rate and to study independently. There was a deliberate effort to avoid the lockstep rigidity that characterized basic medical science education in most medical schools. Accordingly, during the first year a

curriculum was developed that was disease-centered and that required that the students learn those aspects of the basic sciences (e.g., biochemistry, physiology) that would apply to the specific problem (e.g., peptic ulcer). After doing an introductory problem together, students were able to do succeeding problems in any order and at any time they chose. Their physician advisors were to help them by showing them patients who had the particular problem they were studying, and the determination of when a student had mastered a particular problem came from his physician advisor. The faculty played a consultative role only. They were not directly involved in a major way in the learning process.

A good deal of anxiety and uncertainty was created by the lack of structure of work during the first year. Physician advisors were not sure they were giving the students what they needed, the students were not sure they were getting what they needed, and the dean and his staff were not sure that the students would perform adequately on the college-wide standard year-end exam or on the National Medical Boards, Part I. As it turned out, the students did very well on the exams, and 15 of 16 passed the Boards. This, it must be remembered, was after only one year of basic sciences as opposed to the usual two.

Yet, in spite of this success, there were pressures from a number of sources to structure the work more highly. The uncertainty was not pleasant for anyone, and there was some concern that the students' performance was a fluke and ways needed to be found to insure that the performance would be as impressive in the future. Over the next three years, therefore, the physician advisors were given job descriptions and the curriculum was developed to the point that students had a required number of problems to finish in a required sequence in a required amount of time. There thus was a dramatic increase in the extent of formalization of the work. It undoubtedly is true that formalization was required, in part, by the increase in the number of students. This is not the sole explanation, however. The level of uncertainty required by the innovative independent study format was simply not felt to be supportable over time. As the program began to attract national attention and requests for documentation of the curriculum were received, the professional motivations of the staff led to the production of such documentation. Paradoxically, however, this very production process itself represented a kind of formalization that limited degrees of freedom and constrained innovation in the program. And perhaps even more significant, the demands of accreditation bodies made formalization imperative. Thus, although the disease-centered concept underlying the content of the curriculum did not change, the independent study format changed dramatically. Those characteristics of the original structure of work that contributed to its success as an innovation were incompatible with the long run felt need for predictability and stability. Formalization as a response enhanced stability but diminished innovativeness.

Managing Relationships in the Specific Environment

Earlier it was noted that there were both specific and general environmental conditions creating a favorable climate for the establishment of a new medical school at the site of its birth, and the school had to manage relationships with both. A good example of the process of institutionalization and its effects in the specific environment was the evolving role of the faculty. An important component of the specific environment of the school was its relationship to the basic science departments on campus. During the first year this was not an issue. The faculty was small, and all were busy trying to define their roles. At the end of the first year, however, the faculty felt that they were not as directly involved in educating the students as they should be. They persuaded the dean that they should have a broader and more clearly defined teaching and advising role. It was only natural that their role, over time, should evolve in the direction of the traditional conceptualization of teaching and research. The faculty was part of a large, traditional university where such a role was the norm and where their own role was clearly a low-status exception. More important still was the fact that all of the faculty from the beginning had joint appointments with the discipline departments on campus. Joint appointments enhanced their academic credibility among research colleagues at other universities. The dean, too, realized the importance of the joint appointments as a mechanism for enhancing the legitimacy and reputation of his school both within the university and in the larger arena of academic medicine. In the short run, the university could welcome the innovative program as a potentially interesting addition. Over time, however, the school would have to prove its merit—on terms comparable to the other campus units. The first real testing ground was the question of evaluation and promotion of faculty. What criteria should be used and who should be involved in the evaluation process? It was clear that the medical school would not be able to enjoy special privileges and that its faculty would be subject to general campus-wide criteria of research and publication. This was a way in which the specific environment could remove equivocality vis á vis the medical school. Although not unexpected, the effect was a conservatizing one on the faculty. Because they were to be evaluated largely in terms of traditional criteria, there were few incentives to engage in nontraditional behavior.

Once again, one can see the paradox of institutionalization and success at work. The school attracted qualified faculty members both because of the personal persuasiveness of the dean and the record of success of the first year. Although perhaps initially attracted by the innovative character of the program, the faculty responded to the traditional nature of the reward structure that emerged. Their attention became focused more on research and publication and less on developing their roles in ways that would help to maintain the innovative character of the program. Early success as an innovation created conditions that made continued success on that basis difficult.

Managing Relationships in the General Environment

The creation of a public face for the general environment also required certain readjustments for the dean. His interest was not in building an organization of local reputation only. That was important, but he also was interested in national recognition. National recognition not only would be personally rewarding but would make the job of fund raising less problematic.

The dean had a personal conviction that one of the problems in medical education was an overemphasis on specialization, and he wanted to build a program that did not have such an emphasis. He felt that the best form of medical education produced good general physicians. Good general physicians could specialize in anything. Utilization of local physicians, many of whom were general practitioners, as participants in the program was designed, in part, to expose students to the physician's role from the very beginning of their training. The hope was that they then would become better general physicians once their training had been completed. This was another aspect of the school which, at the time of its birth, was innovative.

The need to create a public face and desire to have a program that produced good general physicians led to a dilemma for the dean. The public face had to be legitimate first and foremost in the medical profession and particularly in the field of medical education. Yet the concept of a good general physician was somewhat vague and was often confused with the concept of the general practitioner. General practice, however, did not rank high in the status hierarchy in the field. If his program was to become publicly identified as a general practice program, the dean realized, it would by definition be a low status program. Status in the medical profession is highly prized, and for good reason, because resources tend to flow up the status hierarchy. Needing resources and hence recognition, the dean could not afford a public face that had too strong an overtone of general practice attached to it. Thus, although the program initially was developed around the importance of producing good general physicians, over time the need to project an acceptable public image led to a diminishing emphasis on this aspect. Thus on yet another dimension the program became less successful as an innovation as it became successful as a medical school.

Ensuing Developments

The first four years of the new organization's existence witnessed many interesting and dramatic changes—both quantitative and qualitative—in its structure and operations. As the school grew, it became more conservative. The initial period of heady enthusiasm gave way to a period of negotiating the terms for continued existence. Administrators, staff, faculty, community physicians, and students all made extraordinary

contributions to the development of the school, particularly during its first two years of existence. But the initial enthusiasm proved impossible to sustain for a variety of reasons. By the third year life at the school was characterized by many of the same conflicts, jealousies, and problems that typify life in its more mature counterparts. Altruistic orientations were replaced by instrumental orientations as career imperatives began to intrude. Analytically, one might argue that the emerging dominance of instrumental orientations at the level of individual persons involved with the school not only was perhaps inevitable, but also was a necessary condition for effectiveness. To the extent that each participant was able to maximize his or her own personal goals, the organization as a whole would be more effective (Cummings, 1977). In any case, people began to think more in terms of their own futures than the future of the school, and this shift from a collective to an instrumental metaphor reinforced many of the dynamics that accompanied the shift from the personal to the impersonal metaphor within the school.

The process research evaluation of the school continued on a formal basis for four years. Since that time, when the author left the university, a new development has been unfolding in the school's biography that already has further complicated the evaluation of its success. In the back of the dean's mind from the day he was hired was a vision of a full medical school. Although he was committed to getting a school of basic sciences started, he also was hoping that one day he would preside over a full program. His entrepreneurial appetites were not satisfied with the creation of a basic sciences program alone.

It is impossible here to deal systematically with the implications of the launching of the clinical component of the school. The promise of such an addition has created a renewed sense of enthusiasm both in the school and in the local medical community. The enthusiasm, however, is not comparable to that generated by the inauguration of the school itself. Although the new component is itself innovative, and although the dean has continued to exercise his considerable entrepreneurial skills in its evolution, the enthusiasm is tempered by a history of uneasy relations between the dean and his faculty, by a decidedly wait-and-see posture on the part of the local medical community, and by apprehension and resistance both in other parts of the university and in the state legislature. This development will add new dimensions to the evaluation of the success of the school, a fact which underlines the often evanescent nature of evaluation criteria used.

CONCLUSIONS AND IMPLICATIONS

Clearly, the birth and early development of the new medical school cannot be considered to be typical or to embody the full range of patterns and possibilities that confront the creation of organizations. Yet some of the dynamics surely are not idiosyncratic. The interaction between situational

constraints and the personal characteristics of the founder as a significant constraint on the shape of the early chapters of an organization's biography, the tension between innovation and institutionalization, the transition from personal to impersonal and from collective to instrumental metaphors—all are themes that transcend any particular organizational setting.

Identification of general themes, of course, pushes one in the direction of elaborating general frameworks. But there may be differences in the process of creating nested organizations as opposed to freestanding, fully autonomous entities; public agencies as opposed to private organizations; organizational clones as opposed to innovative organizational forms; corporations as opposed to privately-held enterprises. The inventory of possible influences on the process is lengthy, and organizational researchers are only beginning to appreciate their range and complexity. In addition, there is an intricate web of institutional factors that needs to be integrated more fully into theoretical perspectives on creation. The roles of environmental legislation, of tax incentives, of governmental regulation, and of patent law—to name just a few—are significant and should not be treated merely as a residual category of exogenous influences. As the process of creation captures the imagination of more researchers and as more data are accumulated, the task of building more general frameworks will be facilitated.

Five more specific conclusions and implications are suggested by the analysis of the early history of the new medical school. First, entrepreneurial activity played an important part in shaping its early development. There appeared to be conditions in both the general and specific environments that combined at a particular point in time to favor the birth of a new medical school at a particular site. The decision to establish the school was made by the individuals in the specific environment who responded to these conditions, and it can be understood in macro structural terms. The school's early development, however, cannot be understood without some knowledge of the ambitions, visions, strengths, and weaknesses of its first dean. He was able to take advantage of the conditions that gave birth to the school and use them to help create an innovative program of his own design. Whether one chooses to call him an entrepreneur, a leader, or a guru, the fact is that his personality, his dreams, his flaws, and his talents were largely responsible for the school's early structure and results. One reason that organizational sociologists typically downplay the influence of particular individuals on organizational outcomes is that they study organizations that have already gone through the process of institutionalization, a process designed to remove as much uncertainty as possible from organizational life. Mechanisms have already been developed, in other words, to reduce the amount of influence particular individuals can have on outcomes, and it is not surprising that structural explanations are more efficacious. But for the early stages of organizational development and perhaps for certain periods of

relatively major transformation at other points in an organization's biography, a more catholic approach is necessary.

Second, being both new and different creates short run opportunities and long run problems for organizations because of the uncertainty that accompanies the combination of newness and differentness. This uncertainty is both internal and external, and it adds another dimension to the problem of evaluating success. Internally, individuals are in the process of negotiating new roles. New people are in unfamiliar surroundings where performance criteria are often unclear. Externally, other organizations do not know what to expect from the focal organization and are trying to negotiate relations that will result in greater predictability for them. If an organization is only new, that is, if it is essentially a replication of an existing organizational form, roles are familiar even if the surroundings and people are not. Performance rules and criteria for evaluation of performance are clearer. The basic transition involves applying rules learned in one setting in another. Outside organizations know what to expect and know how—or believe they know how—to evaluate progress and performance. Thus, at the very least, studies of organizational birth and theories of organizational effectiveness should distinguish between the two kinds of cases.

Third, birth and early development, on the one hand, and institutionalization, on the other, are two relatively distinct chapters in the biography of an organization. When an organization is both new and different, as in the case of the new medical school, and thus where innovation is involved, the transition between the two stages is likely to be problematic. Those things which lead to an organization's success as an innovation are not the same as those that lead to longer run success. For the entrepreneur, the transition is likely to be particularly difficult because the institutionalization stage involves removing equivocality and reducing degrees of freedom, both of which are needed in an organization's infancy and both of which appear to be important entrepreneurial hallmarks. Although a public sector organization has been discussed here, private sector organizations no doubt go through similar stages. When an initially successful enterprise goes public to generate more funds for expansion, for example, there is bound to be a conservative effect on development because of the addition of investors with their concerns for predictability and stability to the decision making process.

Fourth, the processes of initiation, innovation, and institutionalization are not the particular province of new organizations. Many organizations go through similar processes at various points in their biographies (Kimberly, 1980), and thus many of the observations made about the new medical school may be applicable to existing organizations as well. What is different is that change in existing organizations has to come in the context of an established culture and an institutionalized set of norms, values, and procedures; whereas in the creation of new organizations, new cultures develop and new norms, values, and procedures are established. A

context, in other words, is created. For organizational researchers, a significant question is why some organizations, once born, are more susceptible to substantial transformations than others and what circumstances create the possibility for transformations to occur. It appears that it is during such transformations that particular individuals can exert unusually large amounts of influence over organizational outcomes, whereas in periods of relative stability highly visible personal contributions are less likely.

Finally, an intensive, longitudinal research design was used to analyze the birth of the new school. The depth of understanding of organizational processes resulting from this approach more than offsets costs due to questions of external validity. The substantive significance of the study is directly traceable to its longitudinal design. The limitations of cross-sectional research are all too apparent and have been discussed elsewhere (Kimberly, 1976a). But what is more challenging for the field are the observations that organizational birth is a phenomenon about which relatively little is known but which may be an important constraint on later development, and that birth, although important, is only one chapter in an organization's biography. These observations suggest an exciting new agenda of research and theory building. Systematic, in-depth, comparative analysis of the birth, life, and death of organizations should lead both to a clearer understanding of the complex nature of organizational success and to more dynamic perspectives on organizations.

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Message Characteristics and Perceptions of Uncertainty by Organizational Decision Makers¹

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A paradigm for the meaning of uncertainty is operationalized in terms of the quality or content of messages presented to decision makers. Results from a psychometric scaling procedure indicate the ability of subjects to distinguish differences in the quality of information in the manner predicted. Data from a laboratory decision making exercise indicate the correspondence of general measures of perceived uncertainty to levels of message quality.

The level of uncertainty faced by decision makers has been cited as an important determinant of behavior in both psychological decision theories and theories of organizational design. Psychological decision theorists have constructed sets of axioms that describe choice processes and have designed experiments to test these axioms (White, 1969). This research typically provides for the manipulation and measurement of levels of uncertainty in highly structured situations in which subjects make choices that resemble gambles. The history of this research reveals a gradual shift from axiom systems that parallel normative or maximizing models toward choice models and axioms that explain the apparent limits on man's ability

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AMJ regrets the sudden and untimely death of William E. Gifford, the senior author of this manuscript. His death occurred after the acceptance of this article. Any reprint requests should be addressed to: Dr. John W. Slocum, Jr., Edwin L. Cox School of Business, Southern Methodist University, Dallas, Texas 75275.

to process information and make choices. Slovic, Fischhoff, and Lichtenstein (1977) give a review of this stream of research and comment on man as an intuitive gambler.

In organization theory and design, coping with uncertainty has been called the central problem of administration (Thompson, 1967). The level of environmental uncertainty has become a major variable in contingency theories of organizational structure (Starbuck, 1976; Miles, Snow, & Pfeffer, 1974; Ford & Slocum, 1977). Although there is general agreement on the importance of uncertainty in the organizational design literature, there is little commonality among researchers or theorists regarding the precise meaning of uncertainty or ways to measure it.

Table 1 presents a list of some of the concepts and definitions that have been used to describe uncertainty in both psychological and organizational research. There is considerable diversity in the terminology used by various authors, but two general concepts seem to characterize the various approaches. The first of these involves overall evaluations of the amount of data, cues, or stimuli available to the decision maker and the timeliness with which it is received. The term *information load*, which refers to the amount of information received in a given time period, is used to characterize this general category of measures of uncertainty. The term *complexity* also fits in this category because a large number of elements in the process is said to produce a complex decision situation.

The second general category of uncertainty concepts have at their core the distinction between *patterns* and *randomness* of events or cues. The classic definition of risk as the ability to assign probabilities to outcomes and of uncertainty as the inability to assign these probabilities (Luce & Raiffa, 1957) is based on differing perceptions of the existence of orderly relationships or patterns. Financial definitions of risk in terms of high variance in returns and the use of volatility indices (Aldag & Storey, 1975) as measures of environmental uncertainty are similar because low variance or low volatility indicates higher levels of patterning or predictability. The extent to which the elements of an organization's environment are patterned has been specifically mentioned as an indicator of uncertainty in two classic articles on environmental turbulence and organizational adaptation to change (Emery & Trist, 1965; Terreberry, 1968). Similarly, the understanding of causal relationships in the task environment (Lawrence & Lorsch, 1967) is an expression of a very precise form of pattern or relationship.

One of the greatest contributions made by information theorists (Shannon & Weaver, 1949; Newell & Simon, 1972; Garner, 1962) has been the distinction between *data* and *information*. In their approaches to this topic the term data refers to cues or message units that have only a *potential* to reduce the level of uncertainty. The relevant cues or the true message that must be identified from the total set of cues, which include data points that are simply "noise" or extraneous inputs.

In the total absence of data a great many alternatives may be seen by decision makers as being feasible, and uncertainty is high. However,

TABLE 1
Some Definitions and Measures of Uncertainty from Psychological Decision Making Research and Survey Research in Organizations^a

Definition or Measure of Uncertainty		Authors
<i>1. Evaluations of Information Load</i>		
<i>Low Uncertainty</i>	<i>High Uncertainty</i>	
a. Enough information	Lack of information	Lawrence & Lorsch (1967)
b. Optimal information	Too little information	Driver & Streufert (1965)
c. Lack of knowledge of outcomes	Too much information	
d. Few relevant cues or sources of information	Sufficient knowledge of outcomes	Duncan (1972)
e. Few alternatives considered	Many relevant cues or sources of information	Duncan (1972)
f. Timely feedback	Many alternatives considered	Garner (1962)
	Delayed feedback	Lawrence & Lorsch (1967)
<i>2. Patterns versus Randomness</i>		
<i>Low Uncertainty</i>	<i>High Uncertainty</i>	
a. Low rates of change	High rates of change; turbulence	Emery & Trist (1965) Duncan (1972)
b. Low variance or volatility in the events considered	High variance or volatility in the events considered	Miller (1956) Aldag & Storey (1975)
c. Similar cues from the environment; elements patterned	Dissimilar cues from the environment; random elements	Emery & Trist (1965) Duncan (1972)
d. Patterned arrival of cues	Random arrival of cues	Crocker, Mitchell & Beach (1977)
e. Clarity of information (patterns recognized)	Lack of clarity of information	Lawrence & Lorsch (1967)
f. Low relative frequency of occurrence	High relative frequency of occurrence	Von Mises (1964)
g. Given some evidence, the event considered is one of a small number of possibilities	Given some evidence, the event considered is one of a large number of possibilities	"Logical probability" (Carnap, 1962)
h. Outcomes known with certainty		
Probabilities can be assigned to events	Probabilities cannot be assigned to events	Luce & Raiffa (1957)
i. High confidence in probability assessment	Low confidence in probability assessment	Duncan (1972)
j. Large difference in the "potential surprise" for rival outcomes	Nearly equal "potential surprise" for rival outcomes	Shackle (1961)
k. Low freedom of choice, low information, few cases, low entropy	Equally probable messages, high information, many cases, high entropy	From Information Theory (Shannon & Weaver, 1949)
l. High understanding of causal relationships	Low understanding of causal relationships	Lawrence & Lorsch (1967)

^aDimensions of uncertainty are shown in two categories. The first category, *Evaluations of Information Load*, refers to estimates of the amount and timeliness of information available to decision makers. The second category contains concepts or definitions of uncertainty that express the difference between *Patterns* and *Randomness* that are recognized by decision makers.

messages that have a very high data content can also be associated with high uncertainty if the messages are "noisy." Consequently, the terms *uncertainty* and *information* have a clear and inverse relationship. The relationship between *data* and *uncertainty* is not clear, however, and

depends upon the amount of noise or extraneous data that is present. Both the terms used here, load and patterns, are present in the information theory approach. Load refers to the number of cues that must be processed and is clearly a data concept. Unfortunately, in the literature this almost always is called information load. Driver and Streufert (1965) give a discussion of optimal levels of load. The existence of patterns in the data implies a low noise level, a redundancy in the cues, or the presence of a simple code that the decision maker can understand.

Considered together, these two concepts imply that uncertainty will be low if data are available at the time needed and if the decision maker discerns a pattern or regularity among the cues that makes the data become useful information. Although the presentation in Table 1 simplifies the various approaches used to define and measure uncertainty, it also reveals some of the critical issues for research on uncertainty.

The first of these issues concerns the two categories used in dividing the uncertainty measures. Even though it is possible to *ask questions* that refer to either information load or pattern recognition, these two concepts are not necessarily independent. For instance, in the mathematical statements of the meaning of logical probability (Carnap, 1962) and entropy (Shannon & Weaver, 1949), a large number of possibilities or outcomes specifically serves to reduce the overall degree of pattern recognition. This is implied by measures of uncertainty developed by Duncan (1972) and Lawrence and Lorsch (1967). A verbal report of "enough information" could imply that enough cues have been processed to yield a pattern that would simplify the choice process. The reverse also could hold. A belief in the existence of a simple pattern relating events or cues (such as a seasonal pattern in sales figures) could allow individuals to process large volumes of data without producing the "overload" that is normally associated with high levels of input. This last comment brings up another issue because *errors* in pattern recognition certainly may occur.

The second issue, the debate over whether uncertainty is a descriptor of the cues surrounding a choice (objective uncertainty) or is a characteristic of the decision maker (perceived uncertainty), appears in both psychological and organizational research (White, 1969; Downey & Slocum, 1975; Downey, Hellriegel, & Slocum, 1977; Driver & Mok, 1975). Judgments or reports of perceived uncertainty are subject to errors of omission or failure to attend to important cues and also to errors of commission or the "hallucination" of patterns or regularities that do not exist in the data (Heider, 1959). Critical reviews of the research on uncertainty for organizational decision makers (Tosi, Aldag, & Storey, 1973; Downey, Hellriegel, & Slocum, 1975) have pointed out the limits of Duncan's (1972) and Lawrence and Lorsch's (1967) instruments for the measurement of perceived uncertainty. A lack of correspondence between publicly available indicators of environmental change and managers' reports of perceived uncertainty has also been noted (Pfeffer, 1978).

The words "objective" and "perceived" imply that the resolution of this issue lies in considering the typical psychological scaling problem. The stimuli in this case are the cues or messages that are potentially available to the decision maker. The responses are the judgments or verbal reports of perceived uncertainty by decision makers. In laboratory situations the term objective uncertainty is useful in describing stimulus conditions that are under the control of the experimenter, such as the stated probability of winning a gamble. Outside of the carefully controlled laboratory situation, the nature of the cues used by decision makers cannot be easily specified, and there appears to be little value in the use of the term objective uncertainty. In the research project described here, message characteristics are manipulated to represent different qualities of information or different decision situations. Thus, message characteristics provide the definition for objective uncertainty. This approach is used in order to validate a theoretical scheme for the meaning of uncertainty and to evaluate its utility in future research.

Another issue in decision making research involves the breadth of the application of the uncertainty concept. In many statements of decision theory, uncertainty is restricted to action-outcome pairs (White, 1969). Perhaps this restriction of the meaning of uncertainty is natural for research in which the alternatives or outcomes are few and obvious (i.e., choose gamble A or gamble B; win or lose a gamble), but it appears to be inappropriate for more complex choice situations. The implicit assumptions of this narrow meaning of uncertainty are that the decision maker knows precisely what all the alternatives are and also can assign values to the action-outcome pairs with certainty. A more complete approach toward the meaning of uncertainty would allow the concept to apply to all of the components of a decision situation—alternatives, knowledge of outcomes, and the values that are attached to action-outcome pairs. Conrath (1967) proposed a paradigm for the overall meaning of uncertainty that considers all three of these components. This is used as the conceptual basis for uncertainty throughout the research reported below.

In Conrath's scheme, uncertainty can exist for the states of nature (the outcomes), the alternative courses of action available to the decision maker, and the payoffs or values that are attached to action-outcome pairs. In this scheme, shown in Table 2, alternatives are described as either finite (a bounded set of which the decision maker is aware) or as unbounded (a psychologically undefined set). An unbounded set of alternatives, for instance, implies that the decision maker has not yet defined the number or the nature of the possible courses of actions that are to be considered. Conrath describes possible conditions for states of nature and payoffs in the same way as being bounded or unbounded. If either the states of nature (S.O.N.) or payoffs are seen as bounded sets, then it is possible further to describe the level of uncertainty in terms of the traditional "ability to assign probabilities" criterion. If payoffs are a bounded set to which the decision maker cannot assign probabilities, this

TABLE 2
Conrath's Scheme for Classifying Decision Situations^a

<i>States of Nature (S.O.N).</i>	<i>Actions / Alternatives</i>	<i>Payoffs</i>
Knowledge about states of nature (i.e., the level of sales of a product over the next year) can be one of four types:	Knowledge about alternative courses of action can be either:	Knowledge about payoffs or the results of an alternative-S.O.N. pair (i.e., a high level of production with low sales) can be one of four types:
Unbounded	Unbounded	Unbounded
Bounded-uncertain	or	Bounded-uncertain
Bounded-risk	Bounded	Bounded-risk
Bounded-certain		Bounded-certain

^aClassification is in terms of evaluation of the knowledge available about states of nature, alternatives, and payoffs. A characterization of a decision situation along these three dimensions reveals the level of uncertainty that is inherent in the situation.

component of the situation is labeled bounded-uncertain. If probabilities can be assigned to the set of payoffs, the component is bounded-risk; if the value assigned to an action-outcome pair is known, the component is called bounded-certain.

In the most certain decision situations, an individual would have knowledge about states of nature and payoffs "bounded-and-certain" for a bounded set of alternatives. The most uncertain situation would be characterized by unbounded sets for states of nature, alternatives, and payoffs. There are 32 possible combinations of the four levels of S.O.N., the two levels of alternatives, and the four types of knowledge about payoffs. Conrath determined that 12 of these 32 possible types of decision situations are logically infeasible. For instance, if the total set of payoffs is known with certainty (a value can be assigned to each alternative/state of nature pair), then the set of alternatives must be bounded. The remaining 20 possible combinations represent logically feasible decision situations that could be used to develop a scale of overall uncertainty. The current study operationalizes Conrath's scheme in terms of message characteristics in order to determine perceptual scale values for different decision situations and to evaluate the usefulness of this uncertainty paradigm in future research.

The study is composed of two experiments. The first represents a pretest in which subjects responded to all 20 logically feasible decision situations. A projective task that required them to make judgments of the potential uncertainty associated with different decision situations was employed. Perceptual scale values of uncertainty for these decision situations then were used to choose five decision situations for further testing in a laboratory exercise that called upon the subjects to make decisions using messages that varied in terms of the quality of information (again using Conrath's paradigm).

PRETEST

The purpose of the pretest was to estimate the ordering of Conrath's 20 feasible decision situations along a unidimensional scale of perceived uncertainty. There are two crucial distinctions between this type of approach and typical survey research methodologies. First, scale values are needed for the stimuli or the items presented to the subjects. In most survey research, the responses to several items made by a single subject are pooled to represent a judgment or evaluation of an attribute that is a common factor in the content of the set of items. In the present case a scale value is determined for each stimulus or item, and the data are pooled across the subjects to obtain a generalized evaluation of their reactions to the specific items.

The second distinction lies in the assignment of numbers to the response categories. In typical survey research, numbers are arbitrarily assigned to response categories. The low end of a Likert scale of responses is coded with a 1, for instance, and the high end of the scale is assigned a 7. In the procedure used in the present research the numbers assigned to response categories are computed on the basis of the frequency with which the subjects use the various response categories in describing the stimuli or items.

Research Questions

1. Do subjects perceive differences in stimuli that vary along Conrath's dimensions of uncertainty?

If stimuli that are purposely varied along the theoretical dimensions of uncertainty do not yield distinct perceptions of uncertainty, the proposed dimensions lack validity, and further research using these dimensions is clearly inappropriate. In terms of the perceptual process, this means that if selective attention systematically operates to exclude a set of cues, then those cues will never contribute to perceptions of uncertainty. Given a set of dimensions for uncertainty to which subjects do pay attention, the relative importance of the dimensions then can be assessed.

2. Which of Conrath's three dimensions of uncertainty (S.O.N., alternatives, and payoffs) appears to contribute most to perceptions of uncertainty?

This question is one of cue utilization. In Conrath's scheme there is no *a priori* means of determining the relative importance of the three components (S.O.N., alternatives, and payoffs). If it can be shown empirically that one of these components is dominant in producing the perceptions of uncertainty (adequacy of information) for various decision situations, then it may be possible to simplify the definition of uncertainty for use in further research.

Method

Subjects—A statement sorting task based on Conrath's dimensions was completed by 84 students enrolled in business administration classes and

seven instructors teaching decision theory courses. The subject pool included 70 males and 21 females, most of whom (87 percent) were between the ages of 18 and 25. Complete, usable data were obtained from 88 of the subjects.

Procedure—Paragraphs that describe Conrath's 20 feasible decision situations were prepared and printed on separate cards. Each card presented a literal description of the type of information that characterizes the decision situation. A sample decision situation card is presented as Table 3. Subjects were presented with a randomly ordered set of cards and were asked to sort them into one of five categories that were labeled extremely high, high, moderate, low, and extremely low in uncertainty. The instructions given to the subjects asked them to consider making a decision given the adequacy of information shown on the card and to sort the cards based on their evaluation of the uncertainty associated with the decision situation. *Uncertainty was described in the instructions as the overall "adequacy of information" available to the decision maker.* This definition and the labels for the response categories were purposely vague to allow the subjects to respond using their own interpretation of the meaning for uncertainty. The distribution of the subjects' responses for each decision situation then was used to evaluate the uncertainty for that situation in the same way that perceptual scale values of "heaviness" are associated with objects that have a known weight on a physical scale.

TABLE 3
A Sample Decision-Situation Card or Stimulus from the Pretest^a

Consider a decision situation in which:

Knowledge about the *states of nature* indicates that there are a *limited* number of possible states of nature relevant to the decision and that there is a *probability* associated with each possible *state-of-nature*.

Knowledge of the *alternatives* available to the decision maker indicates that the range of possible *alternatives* is *limited*.

Knowledge concerning the potential *payoffs* for the decision maker reveals that there are a *limited* number of *payoffs* and that *probabilities* associating various payoffs to the states of nature—alternative pairs are *available*.

^aThe card describes a potential decision situation in which the state of nature and payoff information are in the bounded-risk category and the alternatives are bounded.

Results

The psychometric method that was used to yield unidimensional scale values for perceived uncertainty for the decision situations was the method of successive categories (Guilford, 1954). The first step in this method was to construct a scale for the response categories. The scale values were determined by first computing the cumulative proportion of responses to each stimulus that fell within each of the response categories. These cumulative proportions were then translated into ordinates of the normal distribution that served as index numbers for further processing. Pairwise

differences of these index numbers for adjacent columns of responses (i.e., extremely low and low uncertainty) were computed and averaged over the 20 stimuli to produce a scale value for each response category. Large differences between adjacent response categories indicate that the subjects perceived the categories to be psychologically distinct and the categories will appear as "far apart" on the perceptual scale. The moderate uncertainty category was chosen as an arbitrary zero point for the response category scale values shown in Table 4.

TABLE 4
Psychological Scale Values for Five Categories
of Responses (C_j) for Overall Uncertainty
from the Sorting Task Used in the Pretest

<i>Response Category</i>	<i>Mean Scale Value</i>
Extremely low uncertainty	-2.106
Low uncertainty	-0.9451
Moderate uncertainty	0.0
High uncertainty	+0.8322
Extremely high uncertainty	+3.5056

These scale values reveal that the extremely high category was perceived to be more psychologically distant from the moderate response than was the extremely low uncertainty category. These scale values for the stimuli or decision situations then were computed as the sum of the products of the response scale values (C_j) and the proportion of judgment within each category (P_{ij}):

$$S_i = \sum_{j=1}^5 (C_j)(P_{ij}).$$

These stimulus scale values then were transformed to a common scale that retains the original mean (.1927) but has a standard deviation of one. Table 5 presents these scale values for the 20 stimuli. Higher (more positive) scale values indicate that higher levels of perceived uncertainty are associated with that decision situation.

As Conrath indicated, there is no empirical evidence to support an overall ordering for the predicted or theoretical uncertainty that should be associated with the 20 decision situations that appear in Table 5. However, it is possible to make pair-wise predictions between decision situations that differ along only one of the three components. For instance, if alternatives are bounded and S.O.N. are bounded certain (the first row of the top table), then the theoretically predicted ordering for uncertainty for different levels of payoff information would be: [bounded certain < bounded risk < bounded uncertain < unbounded]. Similarly, if S.O.N.

TABLE 5
Standardized Scale Values for Twenty Decision Situation
Stimuli Based on Conrath's Dimensions of Uncertainty*

S.O.N.	<i>Alternatives Bounded</i>			
	<i>Payoffs</i>			
	<i>Bounded Certain</i>	<i>Bounded Risk</i>	<i>Bounded Uncertain</i>	<i>Unbounded</i>
Bounded Certain	-1.48	-1.28	-0.53	-0.23
Bounded Risk	-1.18	-0.91	-0.09	-0.13
Bounded Uncertain	-0.17	-0.18	+0.80	+0.59
Unbounded	—	—	—	+1.20

S.O.N.	<i>Alternatives Unbounded</i>			
	<i>Payoffs</i>			
	<i>Bounded Certain</i>	<i>Bounded Risk</i>	<i>Bounded Uncertain</i>	<i>Unbounded</i>
Bounded Certain	—	—	+0.51	+0.90
Bounded Risk	—	—	+0.20	+0.47
Bounded Uncertain	—	—	+1.18	+1.60
Unbounded	—	—	—	+2.57

*Empty cells indicate a logically infeasible combination. Higher (more positive) values indicate higher levels of perceived uncertainty.

are bounded-certain, and payoffs are unbounded (the upper right hand corner of both parts of the table) then the predicted ordering for uncertainty would be: [alternatives bounded < alternatives unbounded]. According to this definition, the predicted levels of uncertainty for the cells of Table 5 increase from left to right and from top to bottom within each of the two blocks of the table. Similarly, this definition implies that elements of the lower block of the table (alternatives unbounded) have predicted levels of uncertainty that are higher than *corresponding* elements of the upper block of the table.

Comparisons between corresponding cells of bounded and unbounded alternatives in Table 5 indicate that the unbounded situations were always perceived as higher in uncertainty. Of the 26 pairwise comparisons of perceived uncertainty scale values that can be made within the two levels of alternatives, only 5 are not in the predicted order. The magnitude of these deviations from the predicted ordering is relatively low (no more than .53 units or one half of a standard deviation among the perceptual scale). This general pattern of results and the analysis of variance, which is discussed below, indicate a positive answer to the first research question. Subjects do appear capable of making relatively fine distinctions among stimuli that vary along Conrath's dimensions of uncertainty.

Analysis of variance (ANOVA) was used to answer the second research question. The overall design (subjects \times S.O.N. \times alternatives \times payoffs) is an incomplete factorial design because of the 12 logically infeasible combinations of the dimensions of uncertainty. Consequently, two subsets of the data were analyzed that do represent factorial designs.

In each case, the category scale values were used to represent perceived uncertainty scores. The first subset included the 12 decision situations for which alternatives and states of nature were bounded and represents a subjects \times S.O.N. \times payoffs design. As shown in Table 6, the main effects for both payoffs and states of nature were significant and accounted for nearly equal proportions of the variance in uncertainty scores.

TABLE 6
Abbreviated ANOVA Summary Table for
a subjects \times S.O.N. \times payoffs Design^a

Source	df	F	p(F)	ω^2
Subjects	87	—	—	5
Payoffs	(3,261)	109.0	<.001	19
S.O.N.	(2,174)	186.2	<.001	20
Payoffs \times S.O.N.	(6,522)	2.9	<.01	1

^aTotal number of observations = 1,056.

An ANOVA for the second subset of data for which S.O.N. were bounded and payoffs were either bounded-uncertain or unbounded produced similar results. Three main effects for this design (alternatives, payoffs, and S.O.N.) were all significant ($p < .01$). Payoffs are severely restricted in this design and explained a negligible proportion of the variance in uncertainty scores. Alternatives and S.O.N. were represented across all or nearly all of their full range, however, and explained nearly equal amounts ($\omega^2 = 10$ and 14 percent, respectively) of the total variance. Gifford, Bobbitt, and Slocum (1977) give a detailed discussion of this analysis.

Similar conclusions can be drawn from these two subsets of the data that answer the second research question. When the dimensions of the cues are represented in the analysis across the full extent of their possible ranges, they contributed to perceptions of uncertainty with roughly the same impact or explanatory power. There did not appear to be a single, dominant dimension that determined perceptions of uncertainty.

The primary virtue of the pretest was that each subject evaluated all 20 feasible decision situations. It then was possible to construct a preliminary scale of perceived uncertainty for Conrath's 20 feasible decision situations that could be used to select a smaller, but representative, set of decision situations for further research in a more realistic setting—one in which subjects actually make choices using information that varies along the dimensions identified in Conrath's scheme. The laboratory decision simulation provides a test in which message characteristics were manipulated to correspond to five of Conrath's decision situations. Perceptions of uncertainty were obtained using a questionnaire format.

LABORATORY DECISION MAKING EXERCISE

Research Questions

3. Do perceptions of uncertainty reported in actual decision making situations match the predictions of uncertainty that can be made using Conrath's dimensions?

An affirmative answer to this question would establish a form of validity for the proposed dimensions of uncertainty. If perceived uncertainty varies with the characteristics of messages, then questions about the nature of the messages themselves can be used as an alternative means of describing the task faced by the decision maker.

4. Does an individual differences variable such as characteristic emotional reactions to ambiguous situations (intolerance for ambiguity) (Budner, 1962) moderate the relationship between characteristics of messages and reports of uncertainty?

Persons with a low tolerance for ambiguity are predicted to report higher levels of perceived uncertainty in decision situations that provide very limited (or low quality) information than are persons with a high tolerance for ambiguity.

Method

Subjects—From an original pool of 100 student volunteers recruited from graduate and undergraduate classes in business administration, 60 subjects were randomly selected and assigned to one of 12 experimental groups. Completing the decision simulation were 56 subjects (40 males and 16 females). They were paid \$2.50 per hour for their participation in the experiment. Subjects who participated in the pretest were not used in this sample because it was felt that the sort task would sensitize the subjects to the purpose of the laboratory exercise.

Budner's (1962) Intolerance for Ambiguity Questionnaire was administered prior to the experimental session. The intolerance for ambiguity instrument measures the degree to which persons perceive ambiguity in the environment as a source of threat or as a desirable characteristic. Intolerance of ambiguity thus is an indicator of the way a person evaluates potential decision situations. The reliability estimate based on internal consistency, coefficient alpha (Nunnally, 1967), for the instrument was .65.

Procedure—Working in groups of four or five persons, the subjects completed the Luna I Decision Simulation (Driver & Hunsaker, 1972). The Luna I simulation is designed as a complex decision making environment that represents a compromise between the need for control and the meaningfulness of real life decision situations. The novel environment (the moon) was chosen by Driver and Hunsaker in order to place the subjects on an equal footing in terms of experience with the task. Complexity is

induced into the simulation primarily by requiring the subjects to evaluate and work toward three potentially conflicting goals (NASA approval, scientific productivity, and the health of the colonists). The simulation allows the experimenter to manipulate the adequacy of information in the messages that are the inputs for the groups' decisions and the means of controlling feedback about the impact of the groups' decisions.

The richness and realism of the Luna I decision simulation lend to the importance, or generalizability, of the results. The procedure is an intensive one that simulates administrative choice behavior by requiring subjects to make decisions in groups about the allocation of resources to meet multiple, interlocking goals. Sufficient time is allowed (40-45 minutes per decision) for consideration of inputs and alternatives. As in previous studies (Driver & Hunsaker, 1972; Hunsaker, 1975), the procedure did yield considerable subject involvement. The setting of the simulation (the lunar colony) was purposely chosen by its designers to reduce the impact of specific learning and thus is appropriate for people with limited managerial experience or groups with diverse backgrounds. Consequently, the simulation seemed appropriate for the student sample and appeared to represent the nature of administrative choices with substantially greater realism than would the typical gambling type of task that is used in much of the psychological research on choices under risk.

The subjects took on the roles of a management team in charge of a hypothetical colony located on the moon in the year 2050. Each round of the exercise simulates a month-long period in which the team is called upon to decide which projects they are to begin during the current month. The groups also were required to allocate resources to the projects that they chose. The subjects completed five rounds of simulation, each of which took approximately 45 minutes. The total experimental session for each group lasted approximately four and one-half hours. The experimental sessions began with an orientation period of 25 minutes. During this period the subjects read a participant's manual describing the simulation, the experimenter read instructions, and questions were allowed so that subjects could familiarize themselves with the experimental setting.

During the course of each round, the group received messages about potential projects through a mail chute. The subjects worked around a rectangular table in a conference room and were separated from contact with the experimenter by a series of screens. A schedule of events for a typical round of the simulation is provided below:

<i>Time</i>	<i>Activity</i>
0-20 minutes	Each individual in the group received a series of reports from NASA that described the projects that were available for choice by the group. Individuals read the reports and evaluated each potential project. Group interaction was not allowed in this "individual decision phase."

- 21-35 minutes A report with feedback on the group's performance in the previous round was provided, and group discussion of the current set of projects occurred. The group came to a decision on which projects were to be initiated for the current period. Forms then were completed that described the group's choice.
- 35-45 minutes Individuals completed a questionnaire that elicited their perceived uncertainty about the decision that was made during the current round of the game.
- 46-50 minutes Rest break.

The nature of the messages passed to the group was varied across the rounds of the simulation. The messages were composed of packages of reports about potential projects, which contained data about states of nature, alternatives open to the team, and the expected payoffs for various choices. The reports were written in standard formats, but their content was varied so that the messages matched one of five of the decision situations chosen on the basis of the pretest results. The nature of the decision situations used in the Luna I decision simulation is described in Table 7.

TABLE 7
Characteristics of the Five Decision Situations Used in the Luna I Simulation^a

	Pretest Scale Values: Predicted Level of Uncertainty	Quality of Information About:			Mean Values of Uncertainty From the Laboratory Experiment
		States of Nature	Alternatives	Payoffs	
1	Very low (-1.18)	Bounded risk	Bounded	Bounded certain	50.8
2	Low (-0.17)	Bounded uncertain	Bounded	Bounded certain	56.7
3	Moderate (+0.20)	Bounded risk	Unbounded	Bounded uncertain	56.2
4	High (+0.80)	Bounded uncertain	Bounded	Bounded uncertain	53.5
5	Very high (+1.18)	Bounded uncertain	Unbounded	Bounded uncertain	63.8

^aCharacteristics are described in Conrath's terms for the quality of information provided about states of nature, alternatives, and payoffs. Predictions of the level of perceived uncertainty for these five decision situations are based on the results of the projective sorting task or the pretest for the laboratory study. Numbers in parentheses are the stimulus scale values from the pretest. Higher (more positive) psychological scale values from the sort task indicate higher levels of perceived uncertainty.

In the reports, states of nature were bounded by providing a finite set of conditions that described the difficulty of obtaining results or the capacity of the colony staff to conduct the projects. Payoffs were bounded if a finite set of possible outcomes in terms of the value or benefit to colony members, NASA, or the scientific community was provided in the reports. Alternatives were bounded if the group was given a finite set of six projects from which they were to choose two for implementation. In decision

situations three and five, alternatives were unbounded by allowing the groups to choose the topics and titles for projects, by allowing combined projects (i.e., engineering and medical), and by allowing the group to indicate the number of projects they desired to implement. Conditions of risk were established in the reports by presenting probabilities for the various states of nature of the connection between a state of nature and a payoff. A sample message format is provided as Table 8.

In order to reduce the order of presentation effect, the sequence of the five decision situations was randomly chosen for each of the 12 groups. Feedback to the group concerning its performance was handled in a

TABLE 8
Sample Message Formats from the Laboratory Decision Making Exercise^a

<i>Estimate of the Colony's Ability to Complete the Project as Scheduled^b</i>		
<i>If the percent of required resources allocated to this project is:</i>	<i>Then the degree of completion will be:</i>	<i>Probability of achieving the level of completion:</i>
0-20%	Very Low	.1
21-40%	Low	.2
41-60%	Moderate	.3
61-80%	High	.3
81-100%	Very High	.1

<i>Sample Message Format for Payoff Information That is Bounded-Certain^c</i>		
<i>If the degree of completion is:</i>	<i>Conditional Probability</i>	<i>Then the expected gains, or losses, for the Colony are:</i>
Very low	1.0	Results are not usable by the Colony. Analysis not completed. No material benefit for the Colony or medical science.
Low	1.0	
Moderate	1.0	Same usable results obtained, but the data are not sufficiently reliable to allow adjustments in work schedules.
High	1.0	Some usable results obtained. Limited contribution to scientific knowledge is made. Conclusions still tentative.
Very high	1.0	Colony can use the data to decide if changes in schedules are warranted. A limited contribution is made to scientific knowledge.

^aIn the first part of the message a Medical Project (an alternative) that is available for choice by the group is described in terms of resources and outcomes or the states of nature. In this message the states of nature information corresponds to the bounded-risk category. The second part of the message relates outcomes and the values (or payoffs) to be expected for the colony. The type of payoff information shown is for the bounded-certain category.

^bThe table relates the expected degree of completion with the amount of resources that are made available for the project. When possible, an estimate of the probability of achieving the levels of completion also is shown.

^cFormat shows the benefits, gains, or losses that can be expected given various levels of completion of the project. An arrow is used to relate a level of completion with a potential benefit. The conditional probability of a benefit given a level of completion is shown when possible.

similar fashion. Streufert and Streufert (1970) have shown that failure in complex decision situations is an important contributor to perceptions of uncertainty. To avoid a systematic impact of negative feedback, the performance reports were preprogrammed. Feedback across the rounds of the game was randomly chosen for each group. Because the feedback describes the performance of the group in terms of three goals (scientific achievement, NASA approval, and health), it was still possible for the groups to attribute the feedback to their choices even though the levels of performance on the feedback reports were not directly tied to their actions.

Measurement of Perceived Uncertainty

Two major attempts have been made to develop instruments to measure perceived environmental uncertainty (Duncan, 1972; Lawrence & Lorsch, 1967). However, because the task in the Luna I game is like that of a research director and the setting in the Moon colony is distinctly different from that studied by Lawrence and Lorsch or Duncan, an uncertainty instrument was developed specifically for this study. The instrument had items that are similar to those used by Duncan and by Lawrence and Lorsch. Four distinct components of uncertainty—complexity, adequacy of feedback (knowledge of possible outcomes), affective (emotional) reactions, and the overall adequacy of information—are represented in the 16 item instrument shown in Table 9. Responses were obtained along 7-point Likert scales. The maximum possible score on the instrument (indicating high perceived uncertainty) is 108 and the minimum possible score is 18. The overall mean for perceived uncertainty for all subjects under all decision situations was 56.2, and the overall standard deviation was 12.9. Scores ranged from a low of 23 to a high of 89. Reliability estimates were computed for each round of the game (one score on each questionnaire item per subject) using Nunnally's (1976) coefficient alpha. The estimates ranged from a low of .80 for decision situation two to a high of .86 for decision situation five.

Decision Simulation Results

Individual differences and perceptions of uncertainty (research question 4) were tested by comparing perceptions of uncertainty in two subsamples for the round of the game that was predicted to have the highest level of uncertainty. Subjects who had high tolerance for ambiguity levels (low intolerance scores) were expected to experience lower levels of perceived uncertainty than were individuals with low tolerance for ambiguity scores when the messages in the simulation exercise gave the individuals the lowest quality information (Duncan, 1972). The total sample was split into thirds based on their scores on intolerance for ambiguity. A test then was conducted on total perceived uncertainty scores from the high and low

TABLE 9
Items Used to Measure the Overall Uncertainty of a Decision Situation
or Round of the Laboratory Exercise

The statements shown below can be used to describe the general decision making situation faced by the Administrative Team during this period. Please indicate your feelings or opinions by circling a number for each of the descriptive statements.

1.	Analysis, or breaking information into parts to gain greater understanding, is often part of the decision process. How easy would it be for you to <i>analyze</i> the information you received this period?	Very easy to take apart for study	1	2	3	4	5	6	7	Very difficult to take apart for study
2.	How difficult was it for you to <i>understand</i> the reports that your team received this period?	Very difficult to understand	1	2	3	4	5	6	7	Very easy to understand
3.	An indication of your team's performance is provided by the degree of approval granted to the team's efforts by various groups. Please indicate how easy it is to <i>predict approval</i> from each of the three groups shown below:									
a)	Approval from NASA:	Very easy to predict	1	2	3	4	5	6	7	Very difficult to predict
b)	Approval from the Scientific Community:	Very easy to predict	1	2	3	4	5	6	7	Very difficult to predict
c)	Approval from Colony Personnel:	Very easy to predict	1	2	3	4	5	6	7	Very difficult to predict
4.	How would you feel if you were frequently held responsible for decisions made with this type of information?	Anxious	1	2	3	4	5	6	7	Calm
5.	Please use the scales shown below to describe your job as a Colony Administrator. Was the <i>decision making task</i> ...									
a)	Low risk	1	2	3	4	5	6	7	High risk	
b)	Complex	1	2	3	4	5	6	7	Simple	
c)	Clearly defined	1	2	3	4	5	6	7	Vague, ambiguous	
d)	Low stress	1	2	3	4	5	6	7	High stress	
e)	Novel, unfamiliar	1	2	3	4	5	6	7	Commonplace, familiar	
6.	In general, how would you describe the <i>conditions</i> faced by your team during this period?	Highly certain, stable, predictable	1	2	3	4	5	6	7	Highly uncertain, unstable, unpredictable
7.	Consider the <i>total amount of information</i> your team received during this period. Was there...	Too little information	1	2	3	4	5	6	7	Too much information
8.	In particular, <i>how adequate was the information</i> that you received about...									
a)	Requirements and Resources:	Completely adequate	1	2	3	4	5	6	7	Totally inadequate
b)	The Number and Type of Projects Available:	Completely adequate	1	2	3	4	5	6	7	Totally inadequate
c)	The Gains or Benefits the Colony Could Expect:	Completely adequate	1	2	3	4	5	6	7	Totally inadequate

portions of the sample. Results indicated that there were no significant differences in mean uncertainty scores for the groups that were split on the basis of intolerance for ambiguity.

Consequently, the answer to the fourth research question is a negative one. Individual differences in ambiguity tolerance do not moderate the relationship between message quality and perceived uncertainty. The ANOVA results discussed below reveal substantial individual differences in perceptions of uncertainty within the experimental groups, but ambiguity tolerance does not appear to explain these differences.

Message Content and Perceived Uncertainty

A comparison of the predicted values for uncertainty from the pretest and the actual values of perceived uncertainty from the laboratory experiment is shown in Table 7. The purpose of the pretest was to obtain estimates of potential levels of uncertainty so that a limited number of decision situations could be chosen for the laboratory experiment that would represent a complete range of uncertainty. The scale values of uncertainty from the pretest and the mean values of perceived uncertainty from the laboratory experiment display sufficient correspondence to conclude that the range of uncertainty across the five decision situations is a representative one. The situations (1 and 5) that were predicted to have the highest and lowest levels of uncertainty did in fact yield corresponding perceptions. However, the intermediate steps on the scale (situations 2, 3, and 4) were ordered in a way that did not match the predicted order. In particular, situation 4 was perceived as relatively low in uncertainty.

The analysis of variance, discussed below, reveals that an important factor in the high levels of perceived uncertainty in situations 3 and 5 was the presentation of the alternatives as an unbounded set.

Table 10 presents the data from an analysis of variance design used to answer research question three. Differences in perceived uncertainty scores for subjects within groups, decision situations, and the groups by

TABLE 10
Abbreviated ANOVA Summary Table for Perceived Uncertainty Scores
from the Five Decision Situations

Source	Degrees of Freedom ^a	F
Between groups	11	2.80**
Between subjects within groups	44 (11)	3.18**
Between situations	4 (1)	18.56**
Groups \times situations	44 (11)	3.61**
Subjects \times situations within groups	176 (44)	
Total	279	

^aDegrees of freedom shown in parentheses were reduced to obtain a critical value of *F* that assumes maximal heterogeneity of variance and covariance in the repeated measures design (Keppel, 1973).

***p* < .01

situations interaction were significant. The major components of the design are the decision situations variable, which is a repeated measure factor, and the division of the subjects into managerial teams or groups. Significant differences were found for groups ($F = 2.80, p < .01$) and the *groups \times situations interaction* ($F = 3.61, p < .01$). This could indicate differences because of group composition or because the situations were presented in a different order to each group. The *between subjects, same group* term is significant ($F = 3.18, p < .01$), indicating that group discussion of the projects did not serve to level out individual perceptions of uncertainty. The major variable of interest, the *situations* component, also was significant ($F = 18.56, p < .01$), indicating substantial overall differences in perceived uncertainty for the five levels of message quality.

A set of three comparisons (Keppel, 1973) of the differences between means for the decision situations was examined. The results of these comparisons are presented in Table 11. The first comparison tests for differences among decision situations with bounded and unbounded alternatives and was significant ($F = 37.8, p < .01$). The second comparison contrasts the situations that presented information on states of nature in terms of risk with situations that presented bounded-uncertain cues for states of nature. The statistic for this contrast also was significant ($F = 19.07, p < .01$). The final comparison between situations with bounded certain and bounded-uncertain payoff cues was significant ($F = 15.07, p < .01$). Although the information provided by these three comparisons is not independent (the comparisons are not mutually orthogonal), they do represent the meaningful, a priori categories indicated by Conrath's paradigm for uncertainty. In each planned comparison, the messages with less adequate information yielded higher levels of perceived uncertainty.

DISCUSSION

The results of the sorting task and the laboratory decision simulation provide rather strong support for Conrath's paradigm for describing

TABLE 11
Planned Comparisons of Means for Decision Situations

	<i>df</i>	<i>MS</i>	<i>F</i>
Comparison 1: Bounded vs. unbounded alternatives (Situations 1, 2, and 4 vs. 3 and 5)	1	2695.5	37.8**
Comparison 2: Risk vs. uncertainty in states-of-nature (Situations 1 and 3, vs. 2, 4, and 5)	1	1360.8	19.07**
Comparison 3: Certainty vs. uncertainty in payoffs (Situations 1 and 2, vs. 3, 4, and 5)	1	1120.5	15.07**
Subjects \times situations/groups	176	71.35	—

** $p < .01$

uncertainty. In the pretest, subjects were asked to sort statements into categories that represented their evaluations of the level of uncertainty that would be involved potentially in each of Conrath's 20 feasible decision situations. The psychological scale values for the decision situations closely followed the pairwise predictions that can be made using the scheme proposed by Conrath. Given the projective nature of the task, these results can be taken to mean only that the subjects interpreted the stimuli in a way that was consistent with their intended meaning. These results provide a first step toward the establishment of a unidimensional scale of uncertainty across the 20 types of decision situations. The ANOVA results from the sort task provide support for a more complete definition of uncertainty. The subjects did not respond in a manner that would indicate that any one of three components of a decision situation (S.O.N., alternatives, payoffs) was a dominant or overriding factor in their evaluations of the overall uncertainty.

The sorting task in the pretest allowed the estimation of an overall scale for uncertainty. This approach, however, did not actually require the subjects to *use* information in making actual decisions. In the laboratory simulation, five decision situations, chosen to represent the complete range for uncertainty (or message quality), were presented to the subjects. Here, again, the results of the overall *F*-test (Table 10) and the planned comparisons (Table 11) indicate that changes in message characteristics, following Conrath's paradigm, do yield corresponding changes in perceived uncertainty.

One of the key features of Conrath's paradigm is the distinction between bounded and unbounded sets for S.O.N., alternatives, and payoffs. Of the comparisons in Table 11, the test for differences in perceived uncertainty between bounded and unbounded alternatives yielded the most dramatic difference. Unbounded alternatives were created by requiring the group to decide the number of projects to be chosen for that round of the simulation and to write a title or describe the general topic for the projects they chose. As Conrath predicted, the lack of a "packaged" or readily available set of alternatives does contribute to perceptions of uncertainty. The comparison of risk versus uncertainty in presentation of S.O.N. cues and certainty versus uncertainty in payoff cues also yielded significant differences in perceptions of uncertainty, thus supporting the traditional ability to assign probabilities dimension for the meaning of uncertainty.

A major negative finding of this research was the failure of the intolerance for ambiguity variable to moderate the relationship of message characteristics and perceived uncertainty. Other researchers (Downey et al., 1977; Hunsaker, 1973; Lorenzi, Sims, & Slocum, 1978) have found that variables such as cognitive complexity, intolerance for ambiguity, and the general incongruity adaptation level (GIAL) moderate perceptions of uncertainty. For the student sample, Budner's (1962) intolerance for ambiguity instrument yielded a marginal reliability. This limits its potential

validity as a moderator variable. A more salient feature of the Luna I simulation that may have limited the impact of individual differences is the lack of feedback on individual performance. In the reports cited earlier in which individual difference variables bore a recognizable relation to perceptions of uncertainty, the subjects received individual performance feedback and (in the field studies) were faced with important personal outcomes that could be associated with failure (e.g., Downey et al., 1977; McCaskey, 1976). Abelson (1963) has described decision making in cases in which important personal outcomes exist as "hot cognitive processes" that yield potentially high levels of uncertainty. Janis and Mann (1977) give a psychological conflict model that emphasizes these "hot" decisions. In the absence of individual feedback or personal outcomes for success or failure, individual differences in reactions to uncertainty may be minimal.

An issue not addressed directly is the impact of group processes on perceptions of uncertainty. Using a measure of information deprivation tension (lack of job clarity and lack of needed information), O'Connell, Cummings, and Huber (1976) found that low information specificity was associated with high tension or uncertainty only for tightly structured groups. In loosely structured groups there was no relationship between tension (uncertainty) and information specificity. These authors suggest that group discussion may reduce feelings of inadequate information. All of the groups in the present study would appear to fit the loosely structured criterion used by O'Connell et al. There were no appointed leaders, and structure was emergent rather than specified. In the overall ANOVA (see Table 6), there was a significant "groups" effect.

In the design used in this study, "groups" also represent the order of presentation effect for the decision situations (Beach, Mitchell, Deaton, & Prothero, 1978). Each group received a different, randomly chosen, ordering of the five decision situations. Consequently, the impact of emergent structure on perceptions of uncertainty cannot be evaluated. In the O'Connell et al. study, "information specificity" was manipulated by using various levels of *detail* in the messages presented to the subjects. In Conrath's paradigm, the amount of detail is not directly related to the nature of the decision situation. The largest amount of detail could be associated with the bounded-risk condition, because the elements of the set must be identified along with their stated probabilities. Unbounded sets and bounded-certain sets can be described using fewer details. For this reason, the two studies cannot be directly compared. However, it does appear that the opportunity for group interaction did not serve to obscure the relationship of message quality and perceived uncertainty in the present study.

The validity of a general or broad definition of uncertainty has been examined. Conrath's definition covers the entire choice process from identifying the problem to the actual choice. The definition is also broad because it allows for many potential limits on perceived uncertainty, such

as the individual's experience level or organizational practices that restrain search and choice. The use of this general definition of uncertainty has implication for research both on decision making and on the organizational design process.

Using Conrath's paradigm for uncertainty in decision making research invites the consideration of a very broad range of types of decisions. Connolly (1977) noted that researchers have tended to adopt a limited or "reductionist" view of the choice process. In this approach the decision makers in research projects are presented with a known set of alternatives (each of which has known costs and benefits), which are then evaluated using a known set of evaluation criteria. Many important managerial decisions are not so neatly packaged, and Connolly suggests the use of a broader definition of uncertainty that emphasizes the unbounded nature of decisions under very high levels of uncertainty. See Allison (1971) for some examples. Conrath's definition provides this feature and applies it to states of nature, alternatives, and payoffs.

The implications for organizational design involve the ability of the designer to understand and predict the impact of design choices on the uncertainty faced by members of the organization (Burns & Stalker, 1962). Structural mechanisms such as specialization, centralization, and formalization can reduce uncertainty by limiting or "packaging" decision situations. Specialization limits the scope of the states of nature and the alternatives that are considered by the specialist. Centralization packages decisions for subordinates by limiting the number and seriousness of the alternatives that can be adopted without a review at a higher level. Formalization reduces uncertainty by *categorizing* both the states of nature and the alternatives and by providing the rule that specifies the choice of alternatives for each of the possible states. These three techniques also tend to reduce the explicit consideration of organizational payoffs by specialists or subordinates. Integrating mechanisms (liaison roles, project management, task forces, the matrix design) force the participants to reconsider organizational payoffs. By including more decision makers and persons who represent diverse interests, integrating techniques tend to open up decision situations. The consideration of more alternatives, more potential outcomes, and more evaluation criteria may *create* uncertainty for decision makers in integrative structures (Lindblom, 1959). These examples illustrate the potential explanatory power of Conrath's paradigm in relating structure and uncertainty.

By emphasizing both bounded and unbounded decision situations, this approach allows the consideration of all types of decisions from the routine to the most abstract form of policy making. The specification of the three components of decision situations provides a more detailed understanding of the effects of design choices on individual decision makers within the organization.

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Impacts of Perceived Environmental Variability on Patterns of Work Related Communication¹

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This study investigates the impact of environmental variability on communications within and outside a large R&D laboratory. For high performing subunits, intra-project communication was found to be contingent on the nature of the unit's task; extra-unit communication was inversely related to perceived environmental variability, suggesting that communication with external areas may be mediated by special boundary roles.

Although communication is an important organizational process, research on communication in organizations is not well developed or integrated (Roberts, O'Reilly, Bretton, & Porter, 1974; Utterback, 1974; Porter & Roberts, 1976; Kelly & Kranzberg, 1975). This study attempts to develop the literature by summarizing briefly the basic components of an organizing conceptual framework and then using the framework to develop hypotheses relating environmental conditions to patterns of subunit communication.

The absence of an integrative framework has hindered the progress of communication oriented research (Roberts et al., 1974; Utterback, 1974). One promising framework, based on information processing ideas, has been suggested by Galbraith (1973, 1977), Van de Ven, Delbecq, and Koenig (1976) and Tushman and Nadler (1979). As information processing ideas will guide hypothesis development and analyses, some basic information processing ideas are developed below.

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In order to survive and grow, organizations must be able to cope with work related uncertainty. In order to deal with both internal and external sources of uncertainty, organizations must be able to gather information from the environment, process information within the organization, and then export information back into the environment (March & Simon, 1958; Katz & Kahn, 1966; Buckley, 1967).

One way of dealing with uncertainty is through verbal communication. Verbal (that is, interactive) communication is a particularly effective medium for exchanging ideas, information, and concepts because it permits timely information exchange, rapid feedback and critical evaluation; as well as the opportunity for real-time recoding and synthesis of information (March & Simon, 1958; Searle, 1969; Pelz & Andrews, 1966). Further, substantial research has emphasized the importance of verbal communication for dealing with intra- and extra-organizational problem solving (Myers & Marquis, 1969; Utterback, 1971; Allen & Cohen, 1969; Whitley & Frost, 1973). Finally, the importance of verbal communication as an information medium is accentuated in R&D settings because technology (as opposed to science) is difficult to document and because of the information search behavior of applied scientists and engineers (Gerstberger & Allen, 1968; Menzel, 1966).

Patterns of verbal communication must attend to and deal with work related uncertainty. One major source of uncertainty is the subunit's task environment. The task environment is a source of uncertainty because areas outside the subunit are not under its control and are potentially unstable. Research indicates that the task environment is indeed an important source of uncertainty; and therefore, a source of information processing requirements (Randall, 1973; Duncan, 1972, 1973; Lawrence & Lorsch, 1967). The greater the environmental variability, the greater the work related uncertainty and, therefore, the greater the amount of information processing required to accomplish the subunit's task.

Patterns of communication are an important determinant of information processing ability, and a subunit's task environment is an important source of information processing requirements. What, however, is the relationship between work related uncertainty (information processing requirements), communication patterns (one determinant of information processing capacity), and the performance of subunits? A parsimonious relationship between context, communication patterns, and subunit performance is one of consistency (Galbraith, 1973, 1977; Ashby, 1956; Tushman & Nadler, 1979).²

In order to deal efficiently with uncertainty, subunits must match highly uncertain conditions with complex information processing mechanisms.

²The concept of effectiveness has been defined in a variety of ways (Price, 1968; Pennings, 1975; Steers, 1975). In this research, subunit effectiveness is conceptualized as having three components: goal achievement, integration with other areas, and the ability to adapt to task/environmental conditions. In order to be effective, a subunit must meet its formally defined goals, achieve coordination with other areas, and be able to adapt to changing conditions. Duncan (1973), Lipetz (1965), and Whitley and Frost (1971) give extended discussions of measuring performance in R&D settings.

Conversely, the less uncertainty faced by the subunit, the less its information processing requirements. Therefore, its information processing mechanisms need not be complex. To achieve effectiveness, then, subunits must have communication patterns that are consistent with the nature of their work.

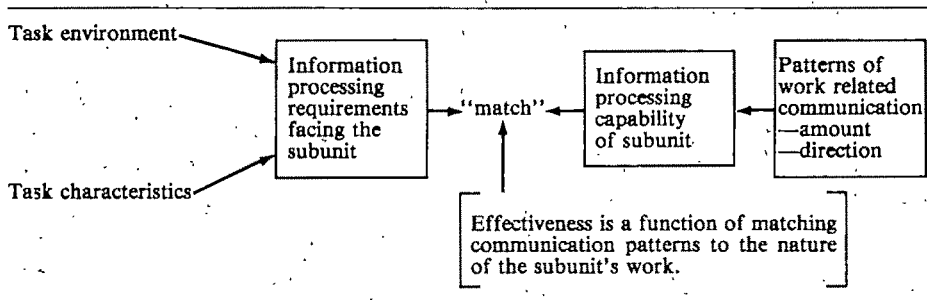
The relationships between a subunit's information processing capacity and the information processing requirements of its work are diagrammed in Figure 1. High performing subunits will be those that match information processing capacity with information processing requirements. For example, in cell B, information processing capacity is not sufficient to deal with the uncertainty associated with the subunit's work (for instance, reliance on supervisory oriented communication in highly complex or uncertain tasks). Decisions will be made with less than the optimal amount of information (Becker & Baloff, 1969). On the other hand, it is possible to have too much information processing capacity for the task's requirements. In such case (cell C), extra information processing capacity is redundant and costly in terms of time, effort, and control (for example, extensive external communication when the subunit's task environment is stable).

FIGURE 1
Relationships Between Information Processing Capacity and
Information Processing Requirements

		<i>Information Processing Capacity</i> (partly a function of communication patterns)	
		High	Low
<i>Information Processing Requirements</i> (partly a function of task characteristics and the task environment)	Extensive	A MATCH	B MISMATCH
	Minimal	C MISMATCH	D MATCH

These ideas do not suggest that uncertainty causes communication patterns. Rather the core idea is that more effectively management subunits develop communication patterns to meet the information processing demands of their work. A mismatch between communication patterns and information processing requirements will be associated with lower performance (Galbraith, 1977; Driver & Streufert, 1969; Tushman & Nadler,

FIGURE 2
An Information Processing Model



1979). These ideas are summarized in Figure 2. The inclusion of task characteristics as a contingent variable is discussed below.

One major criticism of contingency approaches is their lack of clarity as to what constitutes a fit between context and communication. This review introduces information processing ideas as an intermediate step in defining fit. The following section derives specific hypotheses relating communication patterns to perceived environmental variability.

LITERATURE REVIEW AND HYPOTHESES

Several theorists have suggested that the most appropriate way to respond to environmental turbulence is with an adaptive organization—one with flexible roles, decision making at multiple levels, and widespread formal and informal communication (Thompson, 1967; Weick, 1969). From an information processing perspective, the logic supporting these ideas is clear: the greater the environmental uncertainty, the greater the information processing requirements. If work related communication is one way of dealing with information processing requirements, then environmental variability may be dealt with effectively through increased communication (Glanzer & Glaser, 1961; Taylor & Utterback, 1975).

The work on organic/mechanistic organizations provides empirical evidence on the relations between environmental conditions and organizational communication. Burns and Stalker (1966), Negandhi and Reimann (1973), and Miller (1971) report that for turbulent task environments, successful organizations are characterized by intense and diverse communication. Similarly, Duncan (1973) and Lawrence and Lorsh (1967) found that high performing departments facing a changing environment reported more communication than did high performing departments in stable environments.

Results from both organization and subunit levels suggest that successful units respond to turbulent environments by increasing their amount of work related communication. In these studies, however, communication is measured at an aggregate level. No attempt is made to

examine communication with different parts of the organization or with information areas outside the organization. A question, then, can be raised. Do subunits facing a turbulent environment communicate more with all areas within and outside the organization, or is there increased contact with only specialized information areas?

Based on an information processing approach, it can be hypothesized that environmental variability most directly affects *extra-organizational* and *intra-unit* communication because subunits must both attend to and deal with their external environments:

Hypothesis 1: For high performing subunits, the greater the perceived environmental variability, the greater the amount of work related communication both within the subunit and with areas outside the organization.

As other areas in the laboratory and larger organization are only potential sources of problem solving and technical feedback depending on the subunit's work, there should be no association between environmental conditions and communication to these areas (Tushman, 1978; Rosenbloom & Wolek, 1970).

Another hypothesis can be suggested. Van de Ven et al. (1976), Tushman (1978), and Becker and Baloff (1969) have found that the more complex the subunit's task, the greater the communication within the subunit. Hypothesis 1 suggests that the greater the environmental variability, the greater the amount of intra-project communication. The union of these two hypotheses suggests an interaction effect of task characteristics and environmental conditions on intra-unit communication.

For routine tasks, environmental turbulence means more, and perhaps more rapid, routine decision making. The increased frequency of these relatively standard decisions may be best handled through greater supervisory control and a deemphasis on intra-unit peer communication (Duncan, 1973; Smart & Vertinsky, 1977). For more complex tasks, however, environmental turbulence accentuates already complex information processing needs. This substantial work related uncertainty may be best attended to through substantial peer decision making, internal flexibility and increased intra-unit communication (Becker & Baloff, 1969; Maier, 1970).

Hypothesis 2: Under changing environmental conditions, the difference in intra-unit communication between more and less routine task areas will be greater than under stable environmental conditions.

SETTING AND METHODS

This study was conducted at the R&D facility of a large American corporation. Projects within the laboratory were the basic units of analysis. The study focused on all professionals in the facility ($N=345$). The laboratory is isolated from the rest of the corporation and is divided into

seven departments (divisional laboratories). The departments, in turn, are organized into separate project areas. The projects were stable over the course of the research, and each respondent was a member of only one project.

Work Related Communication

The professionals were asked to report their actual, work related, verbal communications for a number of selected days (respondents were asked not to report strictly social communications, nor did they report written communications). These data were collected once a week for 15 weeks, with an equal number of each of the weekdays chosen. The overall response rate was 93 percent. Moreover, 68 percent of all the communication reported within the laboratory was mentioned by both parties (cf. Weiss & Jacobson, 1960). The extra-laboratory data were self-reported data that could not be corroborated with discussion partners.

Project communication is a measure of the average absolute amount of work related communication per person per project over the 15 weeks. Six mutually exclusive communication areas were developed for each project: communication *within the project*, to other areas in the *laboratory* (outside the department), to areas in the larger *organization*, as well as to *professional* (universities, professional societies) and *operational* areas (suppliers, vendors, customers) outside the corporation as a whole. Individual responses were pooled to obtain project communication with these various areas. See Tushman (1978) for a communication correlation matrix.

Project Task Environment

Duncan (1972) and Negandhi and Reimann (1973) suggest that the perceived rate of change of a subunit's task environment is a particularly important contributor to work related uncertainty. Following this research, only a stable-changing dimension of the task environment was investigated.

Due to task heterogeneity within the laboratory, it was necessary to develop dimensions of the environment that would be appropriate throughout the laboratory. Two general sources of environmentally based uncertainty were identified by a group of individuals representing the different task areas: (1) the rate of change of techniques or skills needed to do the job and (2) the rate of change of scientific, technical, or market information domains. These distinct sources of environmental variability were combined to form an overall measure of perceived environmental conditions. (With this general measure, one cannot be sure of the particular locus of the uncertainty. All one can say is the higher the score, the greater the perceived environmental variability. Clearly, future research must go beyond this kind of rudimentary measure and tap environmental conditions through multiple sources of measurement.)

Each respondent was questioned: "We are interested in how rapidly you see the demands of your job changing. To what extent are techniques or skills or information needed for your project changing?" A 5-point scale was employed from: 1) to a very little extent to 5) to a very great extent. Usable responses were obtained from 58 projects. Project scores were calculated by pooling individual scores.

Project Task Characteristics

In R&D settings, tasks differ along several dimensions, including: time span, of feedback, specific vs. general problem orientation, and generation of new knowledge vs. using existing knowledge and experience (Rosenbloom & Wolek, 1970). With these dimensions, the following task categories were developed with the laboratory's management to form a nonroutine (research) to routine (technical service) task dimension.

1. Basic research. Work of a general nature intended to apply to a broad range of applications or to the development of new knowledge about an area.
2. Applied research. Work involving basic knowledge for the solution of a particular problem. The creation and evaluation of new concepts or components but not development for operational use.
3. Development. The combination of existing or feasible concepts, perhaps with new knowledge, to provide a distinctly new product or process. The application of known facts and theory to solve a particular problem through exploratory study, design, and testing of new components or systems.
4. Technical service. Cost/performance improvement to existing products, processes, or systems. Recombination, modification, and testing of systems using existing knowledge. Opening new markets for existing products.

Using these definitions, respondents were asked to select the category that best characterized the objectives of their project and to indicate, on a 3-point scale, how completely the project's objectives were represented by the selected category. The 12 possible answers were scored along a single scale ranging from completely basic research to completely technical service.

As in Pelz and Andrews (1966), respondents also were asked to indicate what percentage of their project's work fell into each of the four task categories. A weighted average of the percentages was calculated for each respondent. The scored responses to these two questions were averaged (Spearman-Brown reliability = .91). Usable responses were obtained from 58 projects. Project scores were calculated by pooling individual scores.

Unit of Analysis

Because projects were the unit of analysis, individual responses were pooled. Several tests were performed to check for the appropriateness of

pooling. Tushman (1977, 1978) gives a discussion of these analyses. These tests indicated that pooling was appropriate for project task environment and project task characteristics. The correlation between these two variables is small ($r = .03$), and the distribution of project task scores falls into three distinct categories: research ($N = 13$), development ($N = 22$), and technical service ($N = 20$).

Project Performance

To generate a single set of dimensions appropriate to this setting, a group of top level managers helped develop a set of specific dimensions that would tap the more general categories of project goal achievement, integration, and adaptability—components of effectiveness named earlier. Performance dimensions included schedule, budget, cost performance, innovativeness, adaptability, and the ability to cooperate with the other areas in the larger organization.

All group managers ($N = 7$) and both laboratory directors ($N = 2$) were interviewed individually. Each was asked to evaluate the technical performance of all projects with which he was technically familiar. The managers were asked for their overall technical evaluations based on a consideration of the dimensions discussed above. Each project was independently rated by an average 4.7 managers on a 7-point scale (from very low to very high). As the intercorrelations of the nine judges were moderately correlated (Spearman-Brown reliability = .81), individual ratings were averaged to yield overall project performance scores. Project performance was categorized as either high or low by splitting the scores at the median. (The management advisory group suggested that the most appropriate performance methodology would be personal interviews focused on a manager's overall technical evaluations, based on a consideration of the specific performance criteria. Thus, although each manager was asked to consider the same performance dimensions, there is no way to assess the actual criteria used in rating the various projects.)

RESULTS

Hypothesis 1 suggested that the greater the perceived environmental variability, the greater would be the amount of work related communication *within the project* and with areas outside the *organization* (operational and professional domains). To test this hypothesis, the mean amount of work related communication for projects facing changing environmental conditions was compared with that for projects facing stable environmental conditions (see Table 1).

The data in Table 1 do not support Hypothesis 1. For the total sample, none of the differences in the amount of communication for projects facing stable and changing environmental conditions is statistically significant; two of the three differences are in a direction opposite to those

TABLE 1
Mean Amount of Work Related Communication for
Different Task Environments^a

	<i>Environment^b</i>		<i>Significance</i>
	<i>Changing</i>	<i>Stable</i>	
Project			
Total	27.3	27.9	
High	26.8	24.9	
Department			
Total	27.9	28.8	
High	29.7	33.8	
Laboratory			
Total	8.7	8.9	
High	6.3	7.0	
Organization			
Total	8.9	13.7	
High	9.5	14.2	
Operational			
Total	2.9	3.2	
High	2.8	3.0	
Professional			
Total	1.2	.9	
High	1.2	.9	
Total			
Total	77.0	81.6	
High	76.5	83.8	

^aFor the total sample ($n = 56$) and the high performing projects ($n = 28$).

^bEnvironment scores were split at the median to get high and low categories.

* $p < .10$ (All other differences not significant)

TABLE 2
Correlations Between Task Environment and Work Related Communication^a

	<i>Total Sample</i> <i>(N = 55)</i>	<i>High Performance</i> <i>(N = 28)</i>	<i>Low Performance</i> <i>(N = 27)</i>
Project	-.06	.00	-.10
Department	-.02	-.13	.07
Laboratory	-.15	-.14	-.09
Organization	-.12	-.15	-.13
Operational	-.02	.00	.02
Professional	.06	.02	.12
Total	-.11	-.13	-.09

^aNo coefficients were significant at $p < .10$.

predicted. Similarly, high performing projects facing changing environmental conditions do not have significantly more communication within the project or with areas outside the organization than do high performing projects that face stable environmental conditions.

The correlations between environmental variability and work related communication also indicate a lack of association between environmental conditions and both intra-project and extra-organizational communication (Table 2). None of the predicted correlations is significantly greater than zero. Indeed, two of the three total sample correlations are negative.

Contrary to predictions, projects did not attend to environmental variability by increasing contact with areas outside the organization. Further, projects did not deal with environmental uncertainty through increased intra-project communication.

Hypothesis 2 suggested that environmental conditions would affect research and technical services projects quite differently. It argued that due to differences in information processing requirements between the two types of projects, environmental variability would be associated with increased intra-project communication for research projects, but would have a lesser effect on intra-project communication for technical service projects.

FIGURE 3
Mean Amounts of Communication Within the Project
for Different Task and Environmental Characteristics

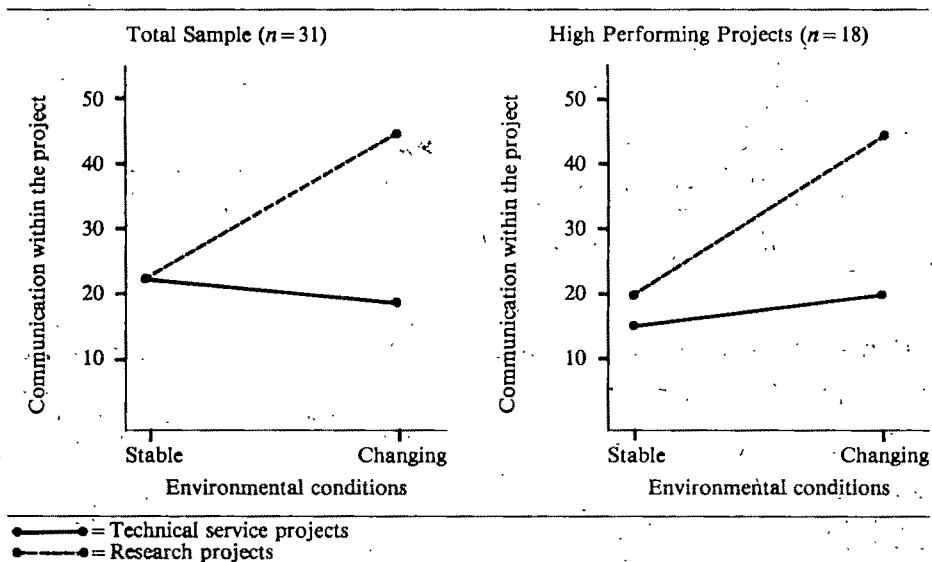


Figure 3 displays the mean amount of intra-project communication for different task and environmental conditions. Research projects have more intra-project communication than do technical service projects. Of more importance, the task-environment interaction follows the direction hypothesized. In a multiple regression analysis, the task-environment interaction term is statistically significant. The regression equations are as follows:

For the total sample:

$$\text{Project communication} = 1.6 (\text{TASK}) + 1.5 (\text{ENVT}) - 2.8^* (\text{TASK} \cdot \text{ENVT})$$

$$R^2 = .12; F = 1.65 (3,50)$$

For high performing projects:

$$\text{Project communication} = 2.3 (\text{TASK}) + 2.7^{**} (\text{ENVT}) - 4.1^{**} (\text{TASK} \cdot \text{ENVT})$$

$$R^2 = .38; F = 4.68^{**} (3,23)$$

The interaction term is not statistically significant for low performing projects.

$^{**} = p < .05$; $* = p < .10$; (TASK·ENVT) is the task-environment interaction term.

Under stable conditions, the difference in intra-project communication between research and technical service areas is small. However, under changing environmental conditions, intra-project communication for research areas increases dramatically but communication within technical service areas is relatively unaffected. These patterns are not found for low performing projects.

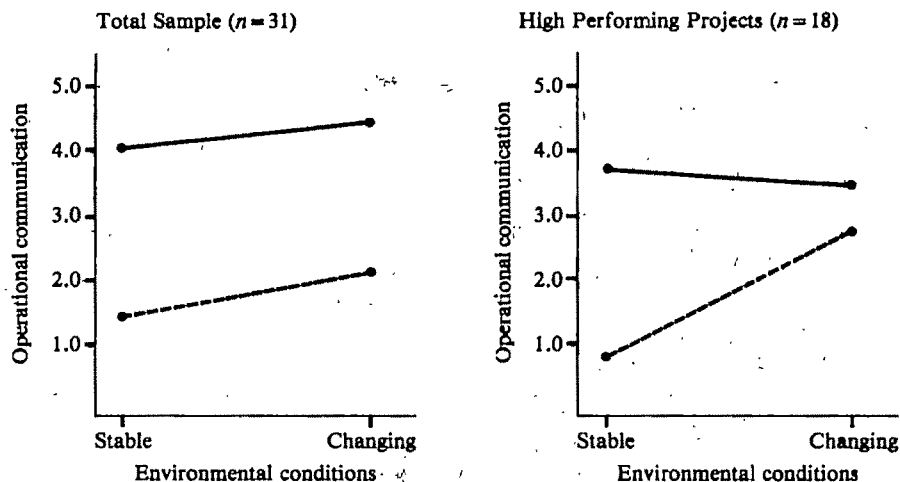
Given the lack of support for Hypothesis 1 and the differential effects of environmental conditions on the amount of intra-project communication, it was decided to test for task specific effects on communication patterns with areas outside the laboratory. The task-environment interactions are graphed in Figures 4 and 5. These figures show some interesting and unexpected patterns. Although there were no overall effects of environmental variability on organizational, operational, or professional communication (see Table 2), environmental conditions do seem to affect high performing research projects quite differently than they affect technical service projects. What is unexpected is the direction of the effects. For high performing projects, differences in extra-laboratory communication between task areas diminish as environmental variability increases.

These patterns are surprising. If professional areas are important to research projects as a source of state of the art knowledge (Utterback, 1974), and if the technical and knowledge base is changing, then research projects should increase their amount of contact with these professional areas. Further, if operational as well as organizational areas supply technical service projects with information on outside products and market needs (Myers & Marquis, 1969; Rosenbloom & Wolek, 1970; Von Hippel, 1976), then technical service projects should increase their contacts with both areas as the task environment becomes more variable.

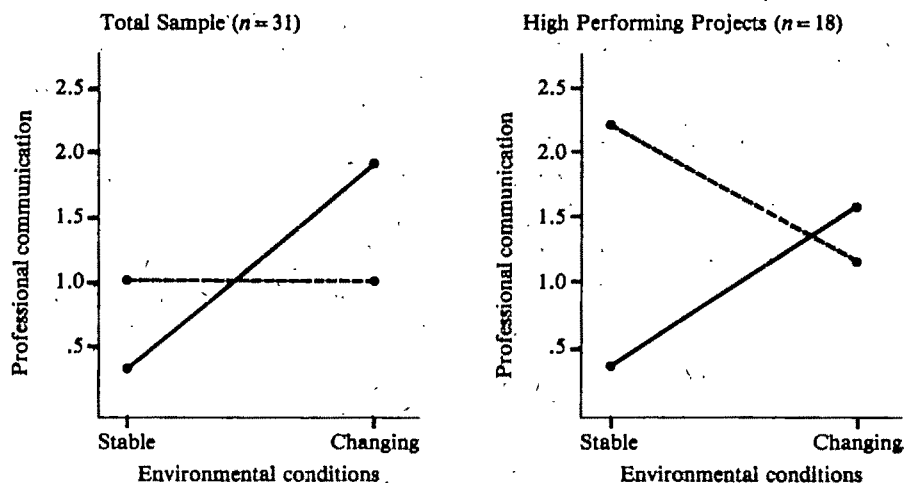
This logic suggests that differences in extra-laboratory communication should increase as environmental conditions become more variable. However, Figures 4 and 5 indicate that for high performing projects, differences in work related communication with areas outside the laboratory decrease as environmental variability increases. Because communication decreases to relevant external information areas as uncertainty increases, a question arises as to how different task areas keep track of turbulent technical, market, and organizational conditions.

FIGURE 4
Mean Amounts of Communication Outside the Organization
for Different Task and Environmental Characteristics

A. Operational Communication (suppliers, vendors, customers)



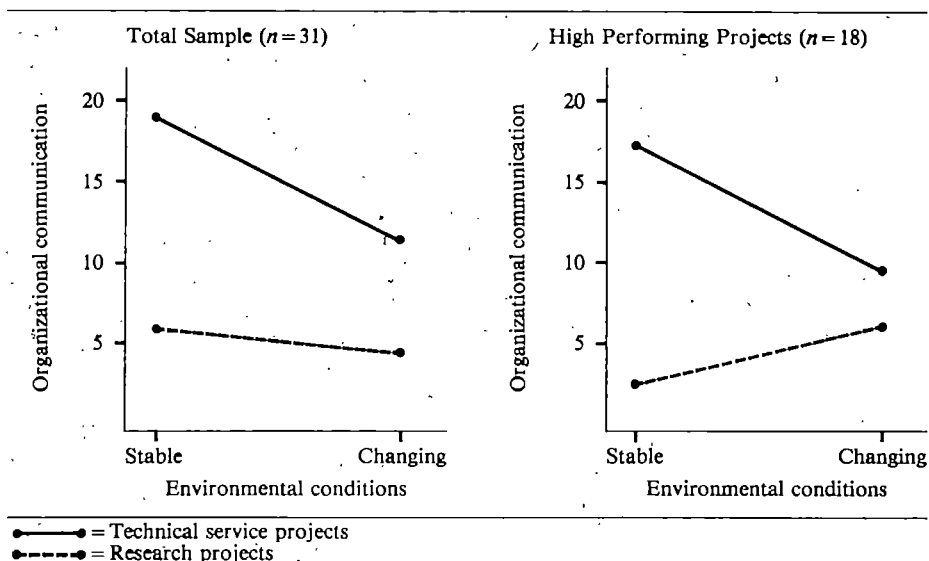
B. Professional Communication (universities, professional societies)



—•— = Technical service projects
 - -•- - = Research projects

The final set of analyses focuses on work related communication with areas within the laboratory and with areas in the larger organization. Because the location of technical support and feedback differs by task area (Tushman, 1978; Whitley & Frost, 1973), it was suggested that there would be no overall effect of environmental conditions on work related communication with department, laboratory, or organizational areas.

FIGURE 5
Mean Amounts of Communication to Organizational Areas
for Different Task and Environmental Characteristics



Tables 1 and 2 support this idea. For these three communication areas, none of the correlations between environmental conditions and work related communication is significantly greater than zero. Further, in only one case out of six is the mean amount of communication for projects in a changing environment significantly different from the amount of communication for projects in a stable environment.

Main effects of environmental conditions on work related communication to these areas are not statistically significant, but the patterns of the means and correlations are striking. For the total sample as well as for high performing projects, correlations between environmental conditions and communication are negative. Further, correlations among high performing projects are each more negative than among low performing projects. Similarly, each of the six communication differences indicates that projects in a stable environment have more extra-project communication than do projects in a changing environment. There seems to be a weak, but consistent, inverse relation between environmental variability and work related communication to areas outside the project but within the larger organization. Project members seem to decrease their communication links as environmental variability increases. If so, the question again can be raised—under changing environmental conditions, when the need for information from the organizational areas is substantial, how are projects linked to these sources of information?

REVIEW AND DISCUSSION

Intra-Project Communication

Hypothesis 1 reasoned that under changing environmental conditions projects would need both to gather information from external areas and to deal with that uncertainty within the project. Communication within the project and outside the organization, therefore, was hypothesized to increase under turbulent environmental conditions. Contrary to expectations, there was no overall effect of environmental variability on intra-project communication. However, Hypothesis 2 suggested that environmental conditions would affect research tasks more than the relatively more routine technical service tasks. As hypothesized, greater environmental variability was indeed associated with increased intra-project communication for research projects but not for technical service projects. These patterns were found only for high performing projects.

This interaction effect suggests systematically different ways of dealing with environmental uncertainty for research and technical service projects. Research projects facing greater environmental variability seem to rely on peer leadership and a diverse of colleague roles to deal with their substantial information processing requirements (Farris, 1972; Becker & Baloff, 1969). These results complement others that found that research projects facing a turbulent environment had more decentralized patterns of intra-project communication than did research projects facing a stable environment (Tushman, 1979). Under changing environmental conditions, then, high performing research projects attend to their substantial information processing requirements with intense and decentralized patterns of intra-unit communication. Because task expertise is distributed throughout research subunits (Andrews & Farris, 1967; Allen, 1977), colleagues (including supervisors) in successful research projects provide each other with problem solving assistance and feedback (Pelz & Andrews, 1966; Farris, 1972).

Technical service projects on the contrary, deal very differently with substantial information processing requirements. These relatively routine task areas that face a turbulent environment do not rely on increased intra-project consultation. Further, other results have found that intra-project communication is more centralized for technical service projects facing a changing environment (Tushman, 1979). These complementary results indicate that high performing technical service projects facing a turbulent environment rely less on intra-project communication and diverse colleague roles, yet more on supervisory involvement and direction. This increased supervisory involvement may be appropriate for relatively routine tasks because the locus of relevant information is most likely to be with supervisors (Rosenbloom & Wolek, 1970; Lawrence & Lorsch, 1967). Under turbulent environmental conditions, supervisors may act as buffers for their projects and are likely to be more directive (Connolly, 1975; Duncan, 1973; Smart & Vertinsky, 1977).



Extra-Project Communication

Because the external environment is an important source of technological and market information, Hypothesis 1 also suggested that there would be greater work related communication with areas outside the organization under changing environmental conditions. There was no support for this hypothesis. However, task specific effects of environmental variability on intra-project communication suggested a look at more specific effects of environmental conditions on extra-laboratory communication.

It was reasoned that due to professional interests and the location of relevant information, research and technical service areas would communicate with different areas outside the laboratory. It was suggested that research personnel would communicate more with external professional areas and technical service personnel would communicate more with external operational areas and with areas in the larger organization. Further, it was argued that if technical and market worlds were turbulent, then to keep track of this increased uncertainty, research projects would have substantial professional communication and technical service areas would have substantial operational and organizational communication.

Contrary to expectations, for high performing projects, environmental variability was associated with decreases in the amount of professional communication of research projects and in the amount of operational and organizational communication of technical service areas. Where work related communication outside the laboratory was expected to increase, it decreased. Consistent with these results, the final analyses indicated a weak but consistent inverse relationship between environmental variability and work related communication to each area outside the project yet within the larger organization. As a set, then, these results indicate that project members closed off their extra-project communication when they encountered changing environmental conditions. (It can be argued that the decrease in external communication is a short-run response and that communication might well increase over time. Although plausible, this alternative explanation is weak. The average amount of external communication for projects facing a changing environment did not increase over the 15 weeks studied.)

Why should extra-project communication decrease under turbulent environmental conditions? It may be that environmental variability is not seen as a source of uncertainty to be dealt with directly, but rather as a source of information overload or threat (Smart & Vertinsky, 1977). Communication across boundaries is inherently difficult (March & Simon, 1958; Dearborn & Simon, 1958), and environmental turbulence seems to accentuate these difficulties. Not only does the overall amount of communication decrease under changing environmental conditions, but research by Wright (1974), Jacoby, Speller, and Kohn (1974), and Lanzetta and Roby (1963) suggests that this decrease may also be associated

with more restricted, biased, and negative information. Under turbulent environmental conditions, when the need for effective linkage with external areas is great, the difficulties of communicating with and gathering information from external areas are accentuated.

How, then, are projects effectively linked to external sources of information? This question can be resolved if the present results are joined with the research on boundary spanning individuals (Allen & Cohen, 1969; Keller & Holland, 1975; Schwartz & Jacobson, 1977; Czepiel, 1975). This research suggests that due to the mismatch in coding schemes between differentiated areas and the accentuation of this mismatch under turbulent environmental conditions, communication with external areas is not distributed evenly but takes place through a limited set of individuals able to translate between several coding schemes.

These boundary spanning individuals link their subunits to external areas and serve to buffer their more locally oriented colleagues from environmental turbulence. In further support for these ideas, Tushman (1977) found that boundary spanning individuals existed to span laboratory, organization, and extra-organizational boundaries. To deal with the increased need for and the greater difficulty of communicating with external areas under turbulent environmental conditions, he also found that high performing projects facing changing environments had significantly more boundary spanning individuals than did high performing projects facing stable environments. These differences were not found for low performing projects.

At the subunit level of analysis, then, environmental turbulence may be dealt with effectively by actually decreasing the overall amount of external communication. To attend to the substantial information processing requirements, special boundary roles evolve to link the subunit to external sources of information. Communication patterns and boundary spanning roles thus are interrelated components of communication networks.

SUMMARY AND CONCLUSIONS

This study has investigated the impact of perceived environmental variability on patterns of work related communication. Several hypotheses were developed and organized within an information processing framework. For high performing subunits, patterns of communication were found to be contingent on the nature of the unit's work. Important contingent variables include the subunit's task environment and the nature of its tasks.

For high performing projects, environmental variability was handled quite differently for alternative task areas. The more complex research projects dealt with environmental variability by having greater intra-project communication. More routine technical service projects relied on less intra-project communication (and perhaps more supervisory involvement). Contrary to predictions, for high performing projects,

increased environmental turbulence was associated with decreases in the amount of extra-project communication. These results, along with results reported earlier (Tushman, 1977), support the existence of boundary spanning roles: individuals who act as link pins between subunits and external information areas. These results, then, provide support for the information processing framework, for the utility of simultaneously investigating several aspects of communication networks, and for the idea that communication networks of high performing units are contingent on the nature of the subunit's work.

Future research could take advantage of the information processing framework by focusing on other sources of uncertainty and on organizational characteristics that impact information processing. This research also supports the usefulness of studying the impact of multiple sources of uncertainty on communication networks. Only with a multivariate approach can either work/communication interactions or interrelations between communication network components be studied. For a more rigorous test of information processing ideas, it is necessary to conduct longitudinal research to track the development of communication networks over time. Finally, important differences emerged when the sample was separated into high and low performing subsamples, indicating that future research should measure subunit performance.

The results reported here are limited to one setting and by the methods employed. Further research is required both to replicate and to extend these results. Although much remains to be done, this research furthers the idea that an information processing framework is a fruitful approach to studying communication in organizations.

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On the Measurement of Corporate Social Responsibility: Self-Reported Disclosures as a Method of Measuring Corporate Social Involvement¹

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This article develops a corporate social involvement disclosure scale based on a content analysis of the annual reports of the Fortune 500 companies. Three results are shown: (1) the change over time of these corporations' social involvement, (2) the direction and scope of this involvement, and (3) the effect that corporate social involvement appears to have on corporate profitability.

A peculiar paradox of American economic history is that the large corporation has been, at one and the same time, the symbol of economic progress and yet a consistent object of criticism for instituting problems for which it has traditionally divested itself of responsibility. Growing corporate interest in social accounting, which is intended to provide the firm with usable measures of social involvement, indicates recent corporate awareness of its linkage to society. The empirical study of corporate social involvement, however, is in an undeveloped state.

In Europe, state owned firms in both France and England have attempted "social contracts" that would record and pay the firms for social activities—apart from their profit making functions. In the United States there has been a frequent call over the past few years, recently in 1978 by

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Secretary of Commerce Kreps, that a social activities report be developed by corporations. As yet, of course, neither the U.S. government nor the accounting profession has required such an annual report. However, the time may not be far off when firms dealing with the U.S. government may have to do even more in social accounting than report their affirmative action activities.

Although the literature on corporate social responsibilities is now substantial, measurement in this branch of organizational research is undeveloped in comparison with measurement in other areas. There are two basic difficulties in measuring corporate social involvement for purposes of research. The first is the unavailability of detailed information in quantitative (monetary and other forms) terms of the social activities that have relevance for the general rubric of social responsibilities. For purposes of research, furthermore, the activities must be measured and reported consistently across a large number of firms in order to enable statistical analyses. The second difficulty is that a methodology must be devised by researchers to measure the full impact of known corporate activities on society. Whereas the first problem is one of enlisting full cooperation from the firms themselves to obtain such information, the latter is one of scientific knowledge that is the responsibility of researchers of the business system, not the corporations. As a result of the combined effects of these two factors, the prospects are not promising in the near future for developing measures of social activities that are convincing and useful for policy purposes in registering the linkage between the corporation and society.

An adequate measure of corporate social activities must be based on a method of data collection in which the investigator (researcher, public interest group, governmental agency, corporate researcher, etc.) has unrestricted access to data on the full range of activities of the firm. The contents of this scale must be independently defined and must measure any form of behavior that is of policy interest. This is the equivalent of the social survey typically used in social research except that the unit of analysis is the organization and not the individual. Although there are no such sources at present, there are three types of published research that attempt to derive usable measures of corporate social activities: (1) social accounting, (2) reputational scales, and (3) content analysis of corporate publications.

Whereas accounting traditionally is considered to be a body of techniques for recording the financial transactions of a firm, the goal of social accounting is to add categories pertaining to the social impact of the firm into the firm's formalized accounting system. But, as Ramanathan notes, "A comprehensive analysis of the social impact of private enterprise suffers at the present time from a general absence of reliable data on aggregate social costs and benefits of business. . . ." (1976, p. 516). It thus must be acknowledged that social accounting is not now at a stage at which the results can be used for decision making purposes. Indeed, in the

1975 report by the American Accounting Association's Committee on Social Costs the committee was able only to indicate exploratory activities by such individuals, organizations, and journals as Dennis Beresford of Ernst and Ernst, George Steiner of U.C.L.A., *Business and Society*, and several consulting firms. However, the report clearly indicates that the primary difficulty in developing a social audit on a professional level is formulating methods of obtaining quantitative measurements of social activities and impacts. The state of the art at present is to have developed categories of activities that need measurement and to have become aware of some of the problems in obtaining quantified data.

The reputational method, commonly used in social research to obtain the response of a public to a social phenomenon, is a second source of data on corporate social responsibilities. Limited scales have been derived from responses from two groups: business students and corporate staffers. Heinze (1976) reports how the student survey was made. The National Association of Concerned Business Students polled 150 graduate students regarding the social involvement of a sample of large corporations. The results were published originally in 1972. The responses were registered on a Likert-type scale ranging from 1 (very poor) to 5 (outstanding). A "no opinion" was assigned a zero. The mean score was the reputed corporate involvement score. Of the 28 corporations that Heinze reported, Xerox was highest with a score of 4.12. Standard Oil of California (1.97), U.S. Steel (2.00), and Bethlehem Steel (2.25), were at the lower end. There thus was substantial variation in the scores. Vance (1975) reported the application of the same methodology but using 86 corporate staffers to obtain ratings of 45 major corporations. The study was conducted in 1972. IBM (4.0) was at the upper end; Standard Oil of California (2.3) and Bethlehem Steel (2.4) again were at the lower end.

A basic difficulty in the use of the reputational method in studying corporate social involvement is that the respondents providing the ratings must be in a position to have detailed information about the corporations in the sample. What is being studied is actually the image of a corporation, which is highly influenced by the corporation's size, age, and access to the mass media, as well as by the experience of the respondent in the business world. Changes in corporate names because of mergers and other reasons also are a complicating factor. How much confidence thus can be put on knowledge about the inner workings of a large corporation by an outside public? A second basic difficulty is that the reputational method limits the number of corporations to be rated. It is easily possible, for example, to ask respondents to assess 10 to 20 objects. This may be accomplished in a few minutes of time and may be achieved with a one or two page questionnaire. The respondents may even be asked to rank 30 or 40 objects. (Occupational prestige studies even ask respondents for responses on up to 110 occupations.) However, there is a need, at the very minimum, to assess the corporate behavior of the entire *Fortune* 500 industrials.

The third source of information is the content analysis of documents and reports of corporations intended for communication purposes. Such sources of information include annual reports, personnel handbooks, and employee newspapers. Media sources include advertising and news releases in papers, journals, radio, and television. Speeches of top executives are another source (Hull, 1971; Bunting, 1971). Bowman and Haire (1975), for example, have reported the results of a content analysis of the annual reports of 82 food-processing firms listed in the 1973 *Moody's Industrial Manual*. Their measure of social involvement was the percentage of the space in annual reports pertaining to corporate responsibilities and activities. They found, for example, that the average was 3.63 percent, although six firms devoted 20 to 23 percent of their annual reports to corporate responsibilities. Their scale is limited, however. It does not indicate the breakdown by issue area. It also is restricted to the food-processing industry. However, the scale used has the value of indicating an aggregate measure of concern with corporate responsibilities.

The purpose of this paper is to pursue the use of self-reported disclosures as a means of constructing a quantitative scale, identified as the Social Involvement Disclosure (SID) scale, obtained from a content analysis of the annual reports of the *Fortune* 500. There are two tasks. The first is to discuss the methodological problems of content analysis in constructing the SID scale. The second is to report three uses of the SID scale in analyzing the *Fortune* 500: (a) to show their responses to corporate criticism and governmental pressure and regulation, (b) to show the dimensions of such corporate responses to current social pressures, and (c) to indicate the implications of social involvement for corporate profitability.

METHOD

Content analysis is a technique for gathering data that consists of codifying qualitative information in anecdotal and literary form into categories in order to derive quantitative scales of varying levels of complexity. The simplest of content analyses consists of nothing more than the attribution of the incidence of an event as indicated by the mention of the event under question in the literary document that constitutes the raw data. In this simple analysis, therefore, the dichotomy is the only level of measure that may be achieved for each category. However, if more than one category is subjected to a content analysis, a more complex level of measurement may be achieved through the summing of the results for each category. Thus, if each category is assigned a score of zero or one, indicating the absence or presence of the attribute under analysis, the resulting scale varies between zero and the number of attributes being investigated.

The codification of the data from the *Fortune* 500 was performed by the "Big-8" accounting firm of Ernst and Ernst under the direction of partner

Dennis R. Beresford (1974a, 1974b, 1975, 1976; Beresford & Feldman, 1976). Beginning in 1971, Ernst and Ernst has developed an annual unpublished summary reporting whether the annual reports of the *Fortune* 500 indicated activities for specific social involvement categories. The SID scale is the sum of the items mentioned for each firm. The number of categories used for coding varies slightly by year. For the 1973 index, the score ranged from zero to a high value of 23. For 1974, the score had a high value of 24. Table 1 indicates the specific indicators of each issue area that were used in the Ernst and Ernst content analysis of the annual

TABLE 1
Detailed Breakdown of Content Areas and Location of Social Responsibility Disclosures in Ernst and Ernst Analysis of Annual Reports of Fortune 500: 1973 and 1974

Issue Areas and Indicators	Ernst & Ernst Code		Disclosure (percent) ^a		Change
	1973	1974	1973	1974	
<i>Environment</i>					
1. Pollution control	01	01	32.5	35.8	3.3
2. Product improvement	02	02	3.8	4.0	0.2
3. Repair of environment	04	03	4.0	3.6	-0.4
4. Recycling of waste materials	03	04	7.3	15.9	8.6
5. Other environmental disclosures	05	05	8.3	30.6	22.3
<i>Equal Opportunity</i>					
6. Minority employment	10	06	17.7	15.9	-1.8
7. Advancement of minorities	—	07	—	12.3	—
8. Employment of women	09	08	14.3	14.1	-0.2
9. Advancement of women	—	09	—	12.9	—
10. Minority business	08	10	4.6	5.8	1.2
11. Other disadvantaged groups	—	11	—	2.6	—
12. Other statements on equal opportunity	11	12	14.5	21.1	6.6
13. Advancement of racial minorities or women	07	—	10.9	—	—
14. Hard core racial minority employment	06	—	0.8	—	—
<i>Personnel</i>					
15. Employee health and safety	—	13	—	13.3	—
16. Training	14	14	13.3	16.1	2.8
17. Other disclosures	15	15	10.5	12.1	1.6
18. Personnel counseling	12	—	0.4	—	—
19. Assist displaced employees locate new work	13	—	1.0	—	—
<i>Community Involvement</i>					
20. Community activities	16	16	14.3	18.3	4.0
21. Public health	17	17	4.2	5.8	1.6
22. Education or the arts	18	18	12.9	15.9	3.0
23. Other community activity disclosures	19	19	8.1	10.5	2.4
<i>Products</i>					
24. Safety	20	20	1.8	3.6	1.8
25. Quality	21	21	1.2	4.4	3.2
26. Other product-related disclosures	22	22	2.6	6.0	3.4
<i>Other</i>					
27. Other disclosures	23	23	9.7	5.6	-4.1
28. Additional information	—	24	—	3.6	—
<i>Location of Disclosures</i>					
1. Letter to stockholders	—	—	21.0	22.5	1.5
2. Separate section of annual report	—	—	24.6	29.2	4.6
3. Other section of annual report	—	—	30.6	52.1	21.5
4. Separate booklet with annual report	—	—	1.2	1.2	0.0

^aIndicator percentages are based on 496 firms in 1973 and 497 firms in 1974.

reports for 1973 and 1974. The issues (environment, equal opportunity, product quality, etc.) reflect the criticisms that are currently being encountered by the modern corporation and also are the targets of governmental regulation. Environment and the specific problem of pollution control have received substantial attention in the annual reports of the *Fortune* 500. However, activities of the corporation also have relevance to such other currently critical issues as equal opportunities for minorities and females, general personnel policies, and involvement with the community and the quality and safety of its products. The location of the social involvement disclosures in the annual reports also is indicated in Table 1. Whereas the disclosures in 1973 tended to be distributed more or less equally among the president's letter, a special section, or the general body of the report, about one-half of the disclosures are in the general body of the 1974 reports. Reporting social involvement activities of the firm thus has become institutionalized into the standard reporting system of the large corporation to its shareholders.

The most basic issue regarding the annual report as a source of social involvement data is whether the reported variation in social activities among firms is a reflection of real activities or is only an index of company policies on communicating activities to shareholders. There are theoretical reasons to expect the corporation to underreport its social involvement activities. Since social involvement activities are also costs, reading of such social activities by shareholders can be taken to mean that the firm's management is failing to put highest priority on the interests of the shareholders by not maximizing income available to be distributed as dividends (Friedman, 1970). Why should management thus be anxious to inform stockholders of such expenditures? On the other hand, the alternative view is that stockholders have a vested interest in the stability and legitimacy of the entrepreneurial institution and the autonomy of that institution from state control. Aware, then, of the criticisms that have been made of the corporation, reading of its progressive views on social responsibilities in the annual report can enhance confidence of the politically savvy shareholder in management's policies. In addition to managerial concern with stockholder response, staff effectiveness and sensitivity to issues also are a determinant of reporting activities. Theoretical arguments thus may be presented that the annual reports both overreport and underreport the social involvement activities of the firm.

Even if it is assumed that the annual reports accurately reflect the social activities of the firm, other problems of a methodological nature are appropriately raised. The raw data in the annual report are not in a state that is immediately usable for research purposes. In order to use the data it is necessary to formulate a set of categories and code the raw data in terms of the categories. Errors of two types thus are possible: (1) the formulation of categories that do not reflect all the issues actually contained in the report that are of policy interest and (2) inaccuracy in coding the raw data in terms of the selected categories. These errors thus affect the validity and

reliability of the resulting scale. A third question might be raised regarding the meaning of the variation obtained in the scale. The only meaning that may be attributed to the scale is that it reflects the variety of social involvement activities. It does not measure the *intensity* of each activity. In order to do this, monetary or impact data would be needed.

Three arguments support the use of the SID scale in organizational research. First, because of the ready availability of annual reports, it is possible to derive social involvement scores for large quantities of firms. The research costs are reasonably low in comparison to other forms of data collection. The annual reports are also public data, thus not requiring cooperation from the firms. (Response rates in voluntary business surveys often are extremely low.) Reputational scales do not allow such quantities of firms to be rated. Based on available Ernst and Ernst data, the scale is now available for almost 500 firms. Nor is there a theoretical reason for limiting the scale to the *Fortune* 500. Indeed, it would be most useful for research purposes to extend the scale to other universes of corporations (such as small corporations) because they are likely to be far less sensitive to social involvement matters than are large corporations. Second, the data are public, and it is possible to replicate the results and thus provide a reliability check on the scale. Reputational scales, on the other hand, are difficult to replicate.

Third, limited validity may be demonstrated for the SID scale. Validity pertains to the extent to which a measuring procedure actually measures the theoretical concept for which the measurement procedure was intended. Is there consistency, then, between the concept (a theoretical construct) and the empirical operations used to study the theoretical concept? Validation is the empirical procedure used to test the consistency between the theoretical concept and the operationalization procedures. "Face" validity, although frequently used, is in fact not an empirical test at all: the operational measures are simply assessed on the basis of their logic and meaning. A more defensible method of validation is to test a given operational procedure for its association with other measures intended to measure the same thing. A high correlation thus gives greater confidence in all the measures under consideration. Table 2 attempts to assess the validity of the SID index through its correlations with the reputational scales based on businessmen and business students reported by Vance and Heinze. (The overlapping of firms unfortunately is quite low because of the small number of firms in the reputational studies.) Of the two scales, it is reasonable to assume that the businessmen's index is based on respondents with greater knowledge of corporate activities. The correlation between the SID scale and the businessman's index is reasonably high (.58), whereas the correlation is lower (.33) with the student index. Both indexes, however, correlate reasonably well with specific issues measured by the SID scale: equal opportunities and community involvement.

TABLE 2
Pearsonian Correlations Between Social Involvement Disclosures,
Businessmen's and Business Students' Social Responsibility Indexes

Fortune 500 Social Involvement Disclosures: 1973-1974	SID Correlations with	
	Businessmen's Index (N = 23)	Business Students' Index (N = 22)
Total index	.58	.33
Environment	.22	-.34
Equal opportunity	.66	.50
Personnel	.11	.01
Community involvement	.41	.53
Products	.49	.08
Other disclosures	.62	.26

RESULTS

Response to External Pressure

The modern, especially large corporation is subject to pressure from both the public in general and government regulatory agencies in particular. (Indeed, the two sources of pressure undoubtedly are correlated.) Table 3 consolidates two sources of data to determine trends in confidence in American institutional leadership from 1966 to 1975. Louis Harris

TABLE 3
Trends in Percentage Indicating a "Great Deal of Confidence"
in American Institutional Leadership in National Samples from 1966 to 1975:
Harris and General Social Survey Data^a

Institution	Harris Data (percent)			General Social Survey (percent)			Percent Change ^b	
	1966 (1)	1971 (2)	1973 (3)	1973 (4)	1974 (5)	1975 (6)	Harris (1966-73) (7)	GSS (1973-75) (8)
Business:								
Major companies	55	27	27	31	33	20	-51	-35
Congress	42	19	21	24	18	14	-50	-42
Education	61	37	33	38	50	32	-46	-16
United States								
Supreme Court	51	23	28	33	35	32	-45	-3
Military	62	27	35	32	41	37	-44	16
Press	29	18	18	23	26	25	-38	9
Science	58	32	37	41	50	42	-36	2
Executive Branch-								
Federal Government	41	23	27	30	14	14	-34	-53
Doctors	72	61	48	55	61	51	-33	-7
Labor leaders	22	14	15	16	19	11	-32	-31
TV	25	22	17	19	24	18	-32	-5
Clergy (organized religion)	41	27	30	36	45	26	-27	-28

^aDavis (1977) and Subcommittee on Intergovernmental Relations (1973).

^bPercentages use initial year as the base and are rounded.

asked respondents in national polls in 1966, 1971, and 1973 whether they had a great deal of confidence, only some confidence, or hardly any confidence in the leadership of the main institutions of the United States. Identical questions on confidence in institutional leadership were included in the General Social Surveys of 1973-1975 (Davis, 1977). The Harris data (1966-1973) indicate that a general decline of confidence in American institutions had occurred at least by 1971. The GSS data (1973-1975) reveal that this confidence had not been regained by 1975. Confidence in big business leadership declined from 55 percent to 27 percent in the Harris polls. The GSS data for 1973-1975 indicate additional decline. The 1975 report indicated that only 20 percent of Americans had great confidence in big business leadership. Although it is essential to consider the decline of confidence in business as part of a syndrome, it is striking that the decline of confidence in big business is on the same order as the decline in confidence in the executive and legislative branches of the federal government.

Fundamental to any interpretation of the decline of confidence in an institution is the basic question of how an institution can ever achieve confidence in the first place. Functional social theory provides at least one interpretation. In this view, a society is comprised of a set of special purpose institutions that operate to achieve specialized tasks through legitimate means. Any perceived disjuncture between legitimate ends and legitimate means will result in a state of anomie of the system (Merton, 1968). It is suggested, therefore, that the most general explanation of the decline in confidence in leadership is the pervasive belief that U.S. institutions are failing to fulfill their functions legitimately. The activities that comprise the social involvement index (equal opportunities, environment, etc.) may be regarded as attempts by the large corporation to regain legitimacy with the public.

Table 4 reports the incidence of one or more items in the social involvement index among the *Fortune* 500 over the years 1971-1975. In 1971, 51.4 percent reported one or more activities. By 1975, this had increased to 85.7 percent. As the corporation increasingly has come under pressure from the public as well as the state, areas of criticism have received even greater

TABLE 4
Trends in Reporting Social Responsibility
Disclosures Among *Fortune* 500: 1971-1975^a

Categories	Percent				
	1971	1972	1973	1974	1975
Firms reporting social responsibility disclosures	51.4	58.1	60.1	69.6	85.7
Firms with no social responsibility disclosures	48.6	41.9	39.9	30.4	14.3
	100.0	100.0	100.0	100.0	100.0
N ^b	(465)	(492)	(496)	(497)	(496)

^aBeresford (1974a, 1975, 1976).

^bReports were not readily available for the remaining *Fortune* 500 firms for each year.

treatment in the annual reports. The social involvement index is one measure of the corporate response of firms striving to regain legitimacy in American society.

Issues and Priorities

Table 5 aggregates the social involvement measures by content area, with the content areas ranked by the emphasis indicated by the 1974 survey. The firms include those in the *Fortune* 500 in the years 1973 and 1974. The percentages by content area may be taken as an index of relative emphasis. Environmental matters constitute the most frequently mentioned area in the annual reports for both 1973 and 1974. In 1974, for example, 50.4 percent of the annual reports indicated concern in various forms with this one issue. (It should be noted that environmental matters were first in importance for both periods even though disclosures by manufacturers of equipment, a likely target of criticism on environmental effects, were excluded for this one content area in 1973.) All other issues have distinctly lower emphasis. In 1974, equal opportunities (32.2 percent), personnel (29.4 percent), and community affairs (25.5 percent) had essentially similar levels of emphasis. The rates of increase in the concern with equal opportunities and personnel (7.7 percent and 9.2 percent, respectively) are similar. It thus is unclear which of these concerns will receive emphasis second to environmental matters in the near future. Involvement in community affairs (25.5 percent) does not appear to be increasing in relative emphasis (4.4 percent increase from 1973 to 1974) and thus should maintain its present order of priority. Safety and quality of products are last (10.5 percent). In sum, environmental matters appear to be of greatest concern to corporate thinking and should remain so in the near future, no doubt because of the threat of political repercussion. Nevertheless, the relative interest put on the various issue areas may be expected to vary, depending on issues that emerge on the national scene.

TABLE 5
Percent of *Fortune* 500 with One or More Social Response Disclosures
per Content Area: 1973 and 1974^a

Content Area	Percents		
	1973	1974	Change
Environment	37.0 ^b	50.4	13.4 ^b
Equal opportunity	24.5	32.2	7.7
Personnel	20.2	29.4	9.2
Community involvement	21.1	25.5	4.4
Products	4.7	10.5	5.8
Other	9.5	8.3	-1.2

^aBased on 494 firms included in *Fortune* 500 for 1973 and 1974.

^bManufacturers of equipment excluded in 1973.

Social Involvement and Profitability

Instead of basing its theoretical system on the assumption that the entrepreneur has a propensity to be socially responsible, or altruistic, the laissez-faire school takes as its premise that the entrepreneur is by nature greedy, self-interested, and does not care at all for the welfare of society. Indeed, Adam Smith argued: "People of the same trade seldom meet together, even for merriment and diversion, but the conversation ends in a conspiracy against the public, or in some contrivance to raise prices" (1937, p. 128). Smith's system is not based on the motivation of the entrepreneur to be socially useful, but rather on the existence of competitive forces in the system as a form of social control that directs the self-interest of the entrepreneur into socially useful channels. Therefore, because competition prevents long run excess profits through control of the market, long run profits become an index of the extent to which the entrepreneur has been able to achieve efficiency and thus minimize costs. Being socially responsible thus is incompatible with this model of entrepreneurial behavior because it may not result in minimum costs. The view that the corporate official should be socially responsible, in Friedman's terms, thus "shows a fundamental misconception of the character and nature of a free economy. In such an economy, there is one and only one social responsibility of business—to use its resources and engage in activities designed to increase its profits so long as it stays within the rules of the game" (1962, p. 133). To attempt any other goal "is a fundamentally subversive doctrine."

If one of contemporary capitalism's leading theoretical spokesmen rejects social responsibility as an obligation of the modern executive, what are the theoretical arguments for corporate social involvement? Arguments supporting corporate social involvement are based on an open-systems model. An open-systems model involves explaining the behavior of organizations as a response to an actual or anticipated external influence. The open-systems model is illustrated in political history by Bismarck's social legislation in late nineteenth century Germany. In order to stem the rising influence of the socialists, Bismarck supported progressive social legislation in an attempt to reduce pressure for more dramatic forms of political change. The progressive social legislation thus was intended to "take the wind out of the sails" of the socialists. Although conservative in purpose, the policy appears to be liberal (as this term has been more recently used). This political mode of thinking is no less applicable to the situation in which the corporation at present finds itself. This model is illustrated by the Narver (1971) thesis on corporate responsibilities and firm welfare. The Narver thesis is that the rational decision maker seeking to maximize the welfare of the firm in the long run must adapt to the demands being made on the corporation to maximize the present market value of the stock of the firm. In order to maximize market value, it is necessary that the investor have confidence that the firm

will not encounter long run sanctions, in particular from governmental sources, because of violations regarding pollution and other social involvement matters. The firm, in foregoing short run profits, thus is contributing to its long-run welfare. The difference, therefore, between Friedman and such advocates of enlightened social involvement as Narver may be a matter of short run versus long run time periods.

Does social involvement of a firm decrease profits to the investor? Research findings on the relation between corporate social involvement and profitability are influenced by the universe of corporations studied, the measure of social involvement, the measure of profitability, and the time frame of the study. The research results consequently are contradictory. There is not conclusive evidence that there is a clear linkage in any direction between corporate social activities and profitability. Vance's (1975) research, for example, appears convincing that corporate social responsibility is inversely linked with profitability in the short run. Vance analyzed the relation between reputational indexes of corporate social involvement derived from ratings of 45 corporations by corporate staffers and 50 corporations by concerned business students and the percent change in the price per share in 1974. Presented in scattergram form, both measures indicated a negative relation between corporate social involvement and change in share prices, although the inverse relation appears stronger for the corporate staffer index than for the student index. There are several limitations of this design, however, which restrict the usefulness of the findings. First, Vance reports the regression coefficients but does not report the correlation coefficients. The strength of the negative association thus is not known. (In the case of the student scale, it does not appear to be strong.) Second, 1974 may not be a representative year. Because 1974 was a disaster in the stock market, it is not appropriate to generalize from that year alone. A longer time period is needed. Third, the change in price per share, although a prime component of the total return to investors, does not consider dividends. Dividends should be included in measuring the return to the investor. There are also other measures of profitability, such as net income per unit of sales, assets, or stockholder's equity, that should be considered in analyzing this problem.

Whereas Vance reported a negative association between social involvement and profitability, studies by Heinze (1976) and Bowman and Haire (1975) report a positive association. The Heinze study was based on the reputational scale of the concerned business students (also used by Vance), and sought to find the connection between this rating for 28 large corporations and several measures of performance for 1972. The design consisted of considering the measure of social involvement as the dependent variable and seven variables as independent (sales growth, net income per unit of sales, operating profit per unit of sales, the current ratio, capitalization, net income per unit of assets, and net income per unit of net worth). Heinze reported that the partial correlation between net income per unit of net worth and the social involvement measure (controlling for all the other

independent variables) was .51. This finding thus appears to support the view that social involvement and profitability are positively correlated. There are two problems in Heinze's research design, however. First, the directionality of the causal model is inverted in terms of the social involvement and profitability issue. The more appropriate design is to consider profitability as the dependent variable and social involvement as the independent variable. Although the zero-order correlations would be the same, problems of interpretation arise because Heinze reported only the statistically controlled correlation between the performance measure and social involvement. It would have been useful had the zero-order correlation matrix also been reported. Second, the universe of corporations is highly restrictive. A sample of only 29 corporations does not provide confidence that the results have wide applicability.

Bowman and Haire used the proportion of lines in annual reports discussing social involvement matters as the index of social involvement. They sought to validate this measure by comparing firms with a reputation for social involvement and a comparison group selected simply on the basis of size and industry. The high or premier groups scored significantly higher on the Bowman-Haire index than did the comparison group, thus providing empirical support for the use of the annual report as an index of social involvement. The Bowman-Haire sample consisted of all the American food-processing firms in *Moody's Industrial Manual* for 1973, which, with deletions, resulted in 82 firms. The measure of profitability was return on investment for 1969-1973 reported by *Standard and Poor's*. Their findings provide support for the view that social responsibility does not appear to threaten the profits received by investors. Those firms reporting some discussion of corporate involvement (31 of 82 firms) had a mean return on investment of 14.3 percent, whereas those with no discussion of social involvement had a mean return of 9.1 percent. The Bowman-Haire study of social involvement appears to indicate that it is not dysfunctional for a firm to be socially involved.

Table 6 assembles available data on 450 corporations of the 1974 *Fortune* 500 to test for the relation between the SID scale and the total return to investors for 1964-1974. The lower involvement firms are those that reported less than three social involvement items in their annual reports of 1973 and 1974. The remaining firms, those reporting three or more items, constitute the high involvement firms. This classification results in 214 and 236 firms for the two categories, respectively. The low involvement firms averaged 2.32 percent and the high involvement firms averaged 2.58 percent average return to investors for 1964-1974. The difference of .26 percent obviously indicates that there appears to be no effect of social involvement for this population of corporations. These results are further stratified by employment size. Those companies with 30,000 or fewer employees in 1974 are considered to be in the lower category and those with greater than 30,000 employees are in the higher. (This is approximately the 70th percentile for the 1974 *Fortune* 500.) Size makes little

TABLE 6
Social Involvement Disclosures, Employment Size and Average Total Percentage Return to Investors from 1964 to 1974: 1974 Fortune 500*

Variable and Groups	Average Annual Total Percent Return to Investors (1964-1974)	
	Mean	N
<i>Social involvement disclosures (SID)</i>		
Total	2.46	450
Low SID (0-2 social disclosure items: 1973-74)	2.32	214
High SID (3+ social disclosure items: 1973-74)	2.58	236
Difference: high minus low	0.26	—
<i>Employment size</i>		
Low (30,000 and under)	2.68	318
High (above 30,000)	1.91	132
Difference: high minus low	-0.77	—
<i>Employment size and SID</i>		
Low employment (30,000 and under)		
Low SID	2.65	174
High SID	2.73	144
Difference: high minus low	0.08	—
High employment (above 30,000)		
Low SID	0.90	40
High SID	2.35	92
Difference: high minus low	1.45	—

*Data reported for 450 firms on which return to investor data are available.

difference in profitability. The small firms averaged 2.68 percent, whereas the larger firms averaged 1.91 percent. When the effects of size are taken into consideration, social involvement appears to have only a very minor effect upon profitability primarily among the larger firms. Among the smaller firms, for example, the difference between high and low social involvement firms was .08 percent. Among the larger firms, however, the less socially involved firms averaged .90 percent, whereas the more socially involved firms averaged 2.35 percent, or a difference of 1.45 percent between the higher and lower socially involved firms. However, this difference is also not substantial. Being socially involved does not appear to increase investors' total rate of return. Nor does it appear that being socially involved is dysfunctional for the investor. Perhaps it is the latter finding that has greater significance for decision making purposes, particularly given current political and social pressures.

SUMMARY

This paper has attempted to develop a social involvement disclosure scale based on a content analysis of the annual reports of the *Fortune* 500. The resulting scale and data were used in three ways: (1) to analyze the response of the *Fortune* 500 to criticism and governmental pressure, (2) to analyze the dimensions of such corporate response, and (3) to analyze the relationship between social involvement and corporate profitability. The self-reported social disclosure method of measuring corporate social

involvement, despite its own drawbacks, was found to have significant advantages as a technique for measuring corporate social responsibility and yielded generally meaningful results when applied to the above questions.

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The Impact of Comprehensive Planning on Financial Performance¹

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The relationship between formal planning procedures and financial performance was examined for a sample of large U.S. banks. It was found that the sample banks that engaged in comprehensive long range planning significantly outperformed those that had no formal planning system. They also outperformed a randomly selected control group.

There is increasing acceptance of the idea that organizations should adopt formal long range planning procedures. Consequently, each year the volume of literature on long range planning techniques and potential benefits expands to satisfy the growing interest. Unfortunately, "how-to-do-it" articles on long range planning have proliferated, but reported research directed at quantifying relationships between formal long range planning efforts and subsequent corporate financial performance has been rare. The present research investigates the relationship between formal planning and subsequent financial performance for selected large U.S. banks. *It was hypothesized that large U.S. banks that had more comprehensive planning would financially outperform those that had less comprehensive planning.* Categories for "comprehensiveness of planning" were developed by grouping the banks according to whether they had strategic long range corporate planning systems and, if so, whether the banks scored high or low on a cumulative planning scale.

LITERATURE REVIEW

A review of previous research reveals that the Ansoff, Avner, Brandenburg, Portner, and Radosevich (1970) team was one of the first to

¹The authors acknowledge the significant contributions of Stanley C. Vance, Harold W. Henry, D. Michael Betz, and John A. Bachmann, all of the University of Tennessee, Knoxville.

investigate the relationship between formal planning and financial performance. These researchers studied the effect of formal planning on the success of acquisitions made by U.S. manufacturing firms. They classified 93 firms as either planners or nonplanners and evaluated the performance of each group using 21 different financial criteria. The results of the study showed that the planners outperformed the nonplanners on almost every criterion. Another early study that attempted to determine whether changes in financial performance were associated with long range planning was that of Thune and House (1970). They investigated the long range planning practices of 36 firms in 6 industries. Their data showed that the "formal" planning firms consistently outperformed the "informal" planning firms in the drug, chemical, and machinery industries, but their data failed to show any clear associations for the food, oil, and steel industries. In the Thune and House study the 36 firms were categorized by size, and five different financial measures were used. Several years later, Herold (1972) replicated the part of the Thune and House study that dealt with the drug and chemical industries. Herold was able to make use of four additional years of financial data, and his findings completely supported those reported by Thune and House.

Another study investigating the relationship between formal planning and financial performance was conducted by Fulmer and Rue (1974). They divided 386 firms into two groups of formal and nonformal planners and then partitioned the firms into the following industrial groupings: nondurable, durable, and service. Four different financial criteria were used to test the hypothesis that firms that use more sophisticated long range planning techniques exhibit better financial performance than do firms utilizing less sophisticated techniques. The results of the Fulmer and Rue research did not reveal a systematic relationship between formal long range planning and financial performance. For the durable goods industry the planners outperformed the nonplanners on all four measures; in the service industry the results were reversed, with the nonplanners outperforming the planners on all four measures; and in the nondurable industry, the results were mixed.

The most recent report of an investigation into the relationship between formal planning and financial performance was by Malik and Karger (1975). They collected planning and financial data on 38 firms in the electronics, machinery, and chemical-drugs industries. The firms within each industrial grouping were divided into "formal integrated long range planners" and "nonintegrated planners," and their financial performances were compared using 13 different economic measures. The formal planners clearly outperformed the informal planners on nine of the financial measures. The results were mixed for the other four measures.

The review of the available empirical studies disclosed conflicting findings in the planning evaluation area. Only one of the studies addressed service industry firms as a separate category, and in that article the authors reported that "the most consistent results appear in the service industries

where the non-planners outperformed the planners in all cases..." (Fulmer & Rue, 1974, p. 6). The present paper reports on the findings of an empirical study in which service industry firms comprised the population. It provides additional evidence on the impact of comprehensive planning on financial performance.

METHOD

The field research for the present study was initiated in June 1976 by mailing a general letter of inquiry on planning activities to the presidents of the 50 largest banks (according to *Moody's Bank and Finance Manual*, 1975 edition) in the following 10 states: Alabama, Georgia, Pennsylvania, New York, North Carolina, Maryland, Illinois, Massachusetts, Virginia, and Tennessee. Mostly eastern banks were selected because of their geographical proximity, which made personal interviews possible within the limits of the researchers' financial resources. Officers in 29 of the 50 banks responded to the request for information. During July and August 1976 personal, depth interviews were held with executives or planning specialists in 17 of the 29 banks. Upon completion of each interview, the interviewee was asked to rate his or her bank's comprehensiveness of planning by means of a quick-answer questionnaire.

The questionnaire contained 18 questions on bank planning practices. The first three questions were devised to collect information on banks that had little formal planning. The remaining 15 questions were on different aspects of formal planning practices. The questionnaire was designed so that the respondent could indicate his or her bank's planning practices during three different time periods—1969, 1972, and 1975. The questionnaire also consisted of instructions and definitions on a cover page. A third page was used to query the bank executives about their corporate objectives—net income, growth, market penetrations, etc. (Copies of the questionnaire may be obtained from the authors.)

Officers in 15 of the 17 banks completed the questionnaire, and the responses were analyzed to determine if they could be combined into a planning scale. The responses were analyzed according to the Guttman Scalogram-Analysis procedure. Information on the Guttman scaling method can be found in Oppenheim (1966); Stagner, Chalmers, and Derber (1958); and Guttman (1944). Of the 18 questions, 6 satisfied the Guttman scale criteria. A revised four-page questionnaire was constructed around the 6 questions, and it was mailed to the 150 largest domestic, nonrelated, nonspecial purpose banks in the 48 contiguous states and the District of Columbia.

The mailing of the 150 questionnaires yielded 92 responses, or a 61 percent response rate. Not all of the respondents were able to provide complete information on the section of the questionnaire of concern here. That problem, coupled with incomplete or consolidated financial statements for some banks, reduced the sample size to 41, a 27 percent response rate for purposes of this paper.

The responses from the 41 banks were analyzed according to the Guttman Scalogram Analysis procedure. It was determined that the previously identified six questions did satisfy the Guttman scale criteria for the expanded sample. Therefore, the questionnaire data were used to subdivide the banks into the following three categories: (1) banks that did not have strategic long range corporate planning systems by September 1, 1976 (nonplanners); (2) banks that had strategic long range corporate planning systems and scored high on the planning scale in 1972 and 1975 (comprehensive planners); and (3) banks that had strategic long range corporate planning systems and scored low on the planning scale in 1972 and 1975 (partial planners).

In addition, a control group of 20 banks was randomly selected from the initial set of 150 banks. (Of the 20 banks in the control group, 9 participated in the study and are included in other sample categories as well. The following is a profile of the control group: comprehensive planners, 7; partial planners, 1; nonplanners, 1; and unknown, 11.) Because the control group was randomly selected, it presumably contained comprehensive planners, partial planners, and nonplanners in approximately the same proportion that they exist in the population. Thus, the control group provided a measure of the performance of a typical group of large U.S. banks. By subdividing the banks in this manner it was possible to make comparisons between the four groupings and test the hypothesis that large U.S. banks with more comprehensive planning financially outperform those banks with less comprehensive planning.

Financial performance over the five-year study period (1972-1976) was analyzed with respect to two performance measures: growth in net income and return on owner's investment. Thus, for each of the four groups of banks examined in the study, both the average annual percentage increase in net income from 1972 to 1976 and the average annual percentage return on owner's investment over the same period, were computed.

In computing a group's percentage increase in net income for a given year, two alternative averaging methods were used to combine the performances of the individual banks into a single measure for the entire group. The first method, which will be referred to as method A, consisted of summing the individual net incomes for all banks in the group for the year in question and comparing the total with that of the previous year. With this method, the percentage increase in net income for a group of banks in a given year was computed from the *total* of the net incomes for the banks in that group. This method was essentially a weighted average, with net income serving as the weight.

The second method, to be called method B, consisted of computing the percentage increase in net income for the year in question individually for each bank in the group and then simply averaging them together. With this method, all banks in the group had equal weight, but the annual percentage changes for the group tended to be quite volatile. Both methods are used here to determine whether the manner in which the data are averaged has an effect on the results.

In a similar manner, the two averaging methods were used to combine the data for the individual banks into a single measure of the return on owner's investment for each group in each year of the study. For method A, the procedure was to sum the net income for all banks in the group and year in question and compare that to the total of the owner's investment for all banks in the same group and year. For method B, the percentages were computed individually for each bank in the group and averaged together to determine the group's percentage return in that year.

Averaging methods A and B are described as follows. Percent change in net income (I) for each year in the study was obtained by:

Method A:

$$\frac{\sum_{b=1}^n I_{b,y} - \sum_{b=1}^n I_{b,y-1}}{\sum_{b=1}^n I_{b,y}} \times 100$$

where b is a particular bank, n is the number of banks in the group, and y is the year in question.

Method B:

$$\frac{\sum_{b=1}^n \left(\frac{I_{b,y} - I_{b,y-1}}{I_{b,y}} \right)}{n} \times 100$$

where b is a particular bank, n is the number of banks in the group, and y is the year in question.

Percent return on owner's investment (O) for each year in the study was obtained by:

Method A:

$$\frac{\sum_{b=1}^n I_{b,y}}{\sum_{b=1}^n O_{b,y}} \times 100$$

where I is net income, b is a particular bank, n is the number of banks, and y is the year in question.

Method B:

$$\frac{\sum_{b=1}^n \left(\frac{I_{b,y}}{O_{b,y}} \right)}{n} \times 100$$

where I is net income, b is a particular bank, n is the number of banks, and y is the year in question.

FINDINGS

Table 1 compares the performances of the four groups of banks with respect to net income growth when method A is used to compute the percentage change in net income for each group in each of the five years. Each row and column in the matrix represents one of the four groups of banks in the study. Beneath each row designation is indicated the number of banks in that sample group (n_B), the average annual percentage increase in the net income for that group over the five-year period (\bar{x}), and the standard deviation of the annual percentage increases in net income (s).

TABLE 1
Differences in Performance (1972-1976)
Averaging Method A
Performance Measure: Average Annual Percent Increase in Net Income

	<i>Comprehensive Formal Planners</i>	<i>Partial Formal Planners</i>	<i>Control Group</i>	<i>No Formal Planning System</i>
Comprehensive formal planners ($n_B = 26$; $\bar{x} = 11.928$; $s = 3.865$)		1.956	6.992*	9.830*
Partial formal planners ($n_B = 6$; $\bar{x} = 9.972$; $s = 7.470$)			5.036	7.874
Control group ($n_B = 20$; $\bar{x} = 4.936$; $s = 4.466$)				2.838
No formal planning system ($n_B = 9$; $\bar{x} = 2.098$; $s = 10.834$)				

* $p < .05$

For example, Table 1 shows that there were 26 banks in the study that engaged in long range strategic planning over the study period. For each of the five years being studied, method A was used to combine the net income performance of these 26 banks into a single measure of the percentage change in net income for the entire group. Over the five years, the average of this group's increases in net income was 11.928 percent with a standard deviation of 3.865 percent.

Differences in the performance of the four groups from 1972-1976 are computed and summarized in the body of the matrix in Table 1. The differences are determined by subtracting the performance measure (\bar{x}) of the column group from that of the row group. For example, comprehensive planners in the sample increased their annual net income by an average of 11.928 percent from 1972 to 1976, but on the average the annual net income of the six partial planners increased by only 9.972 percent. The difference of 1.956 percent is recorded in the matrix.

In terms of the research hypothesis of this study, one would expect the comprehensive planners to outperform the other three groups of banks, the partial planners to outperform both the control group and the

nonplanners, and the control group to outperform the nonplanners. Examination of Table 1 reveals that the differences in net income growth are all in the hypothesized direction.

Statistical significance was determined by the use of *t*-tests. For each group of banks, five performance figures were computed—one for each year of the study. The performance comparisons in Table 1 (and other tables that follow) are based on the mean of these five annual performance measures. The *t*-tests were used to test the hypothesis that the population means for any combination of groups are the same, and that the differences recorded in the matrix are solely the result of sampling error. The results in Table 1 indicate that, with regard to net income growth over the period of 1972-1976, the 26 comprehensive planners as a group significantly outperformed (at the .05 level) both the randomly selected control group and the group of 9 banks with no planning system.

Table 2 presents the comparisons when method B is used to measure each group's income growth in a given year. The table shows that the comprehensive planners again outperformed all other groups of banks in net income growth and that all the differences are significant at the .10 level. When method B is used, the partial planners increased their annual net income at a lower rate (1.888 percent) than both the control group (6.476 percent) and the group of nonplanners (3.976 percent). Aside from this reversal in performance of the partial planners, methods A and B yield essentially the same results. Of major importance is that, regardless of averaging method, the comprehensive planners significantly outperformed both the nonplanners and the random control group.

TABLE 2
Differences in Performance (1972-1976)
Averaging Method B

Performance Measure: Average Annual Percent Increase in Net Income

	<i>Comprehensive Formal Planners</i>	<i>Partial Formal Planners</i>	<i>Control Group</i>	<i>No Formal Planning System</i>
Comprehensive formal planners ($n_B = 26$; $\bar{x} = 9.462$; $s = 3.022$)		7.574*	2.986*	5.486*
Partial formal planners ($n_B = 6$; $\bar{x} = 1.888$; $s = 10.202$)			-4.588	-2.088
Control group ($n_B = 20$; $\bar{x} = 6.476$; $s = 3.672$)				2.500
No formal planning system ($n_B = 9$; $\bar{x} = 3.976$; $s = 7.480$)				

* $p < .10$

A comparison of the performance of the four groups of banks in terms of the average annual percentage return on owner's investment from 1972-1976 is presented in Table 3 (method A) and Table 4 (method B).

Table 3 shows that when method A is used, both the comprehensive planners and the partial planners had significantly higher (at the .01 level) average annual returns on owner's investment than did the control group and the group of nonplanners. Surprisingly, the partial planners had a slightly higher (13.596 percent) average annual return over this period than did the group of banks that scored high on the planning scale (12.780 percent).

TABLE 3
Differences in Performance (1972-1976)
Averaging Method A
Performance Measure: Average Annual Percent Return on Owner's Investment

	<i>Comprehensive Formal Planners</i>	<i>Partial Formal Planners</i>	<i>Control Group</i>	<i>No Formal Planning System</i>
Comprehensive formal planners ($n_B=26$; $\bar{x}=12.780$; $s=.603$)		-.816	2.548*	2.700*
Partial formal planners ($n_B=6$; $\bar{x}=13.596$; $s=.992$)			3.364*	3.516*
Control group ($n_B=20$; $\bar{x}=10.232$; $s=.761$)				.152
No formal planning system ($n_B=9$; $\bar{x}=10.080$; $s=1.141$)				

* $p < .01$

When method B is used (Table 4) to determine the percentage return for each group in a given year, the comprehensive planners outperformed all other groups of banks. Additionally, the average annual return of the comprehensive planners (11.510 percent) is significantly higher (at the .05

TABLE 4
Differences in Performance (1972-1976)
Averaging Method B
Performance Measure: Average Annual Percent Return on Owner's Investment

	<i>Comprehensive Formal Planners</i>	<i>Partial Formal Planners</i>	<i>Control Group</i>	<i>No Formal Planning System</i>
Comprehensive formal planners ($n_B=26$; $\bar{x}=11.510$; $s=.386$)		.188	.970**	.802*
Partial formal planners ($n_B=6$; $\bar{x}=11.322$; $s=1.214$)			.782	.614
Control group ($n_B=20$; $\bar{x}=10.540$; $s=.460$)				-.168
No formal planning system ($n_B=9$; $\bar{x}=10.708$; $s=.818$)				

* $p < .05$

** $p < .01$

level) than that of the control group (10.540 percent) and the group of nonplanners (10.708 percent). The partial planning group again outperformed both the control group and the nonplanning group, but the differences are not statistically significant at the .05 level. Surprisingly, Table 4 shows that the group of banks that did not engage in long range strategic planning had a slightly higher average annual return than did the control group. As was the case with net income growth, an important finding is that the average annual return on owner's investment for the comprehensive planners is significantly higher than that of both the nonplanners and the random control group, regardless of the averaging method employed.

DISCUSSION

In this study, a group of large U.S. banks that engaged in comprehensive long range planning financially outperformed two other groupings of large U.S. banks that were either randomly selected or were identified as not having formal planning systems. The research results with respect to large U.S. banks that utilize comprehensive long range planning systems are consistent with previous findings in other industries for which the sample was dichotomized in a similar manner—extensive versus minor (Ansoff et al., 1970), formal versus informal (Thune & House, 1970; Herold, 1972), and integrated versus nonintegrated (Malik & Karger, 1975). The findings are not consistent with those of Fulmer and Rue (1973) who compared a collection of firms in the service industry according to their planning activities and did not find that the firms differed in financial performance. They did speculate, however, that a look at individual industries within the service industry might result in findings similar to those discovered in this research.

An attempt also was made in this study to partition out a group of banks that were formal in some of their planning practices but that did not have comprehensive long range planning systems. A similar approach was taken by Fulmer and Rue (1973), who placed the firms in their study into three categories—impoverished, programmed, and progressive. The programmed and progressive categories they used were similar to the respective groupings labeled "partial" and "comprehensive" in this study. Fulmer and Rue did not find any statistical support for a difference in financial performance when they conducted comparisons between groups of firms in their programmed and progressive categories.

Similar results were observed in this study. No consistent relationship was identified between the financial performance of the comprehensive and partial planners. In fact, the relative performance of the two groups with respect to return on owner's investment varied with the method used to average the data. For net income growth, the comprehensive planners outperformed the partial planners, but only when method B was used to compute average income growth was the difference statistically significant at the .10 level. In general, the relatively strong showing of the partial

planners might be attributed to the fact that all of the sample banks in that category had profit planning systems to guide and coordinate bank operations.

In the only financial comparison in which the partial planners were significantly outperformed by the comprehensive planners (net income growth, method B), an interesting observation can be made. The smallest bank (in terms of net income) in the partial planning group suffered a drastic reduction in profit during the study period because of heavy involvement in the real estate investment trust business. Because method B gave equal weight to the profit changes of each bank in the group, the average increase in net income for the partial planners was reduced greatly. This condition is reflected in the large difference between the average income growth of the partial planners under methods A and B and the poor showing of the partial planners relative to the control group and the nonplanners in Table 2. An argument could be made, however, that a comprehensive long range planning system would have helped avoid such a drastic profit reduction.

It should be pointed out that the present study involved a relatively small number of banks in the partial planning group ($n=6$) and the nonplanning group ($n=9$). When sample sizes are small, there must be a relatively large difference in sample means in order to conclude statistical significance; that is, in order to be confident that the population means are not the same. In this study, the differences were consistently large enough to conclude statistical significance when the financial performance of the comprehensive planners was compared with that of either the nonplanners or the random control group. The fact that these significant differences occurred regardless of how the data were averaged or which financial measure was used lends credibility to the idea that comprehensive planning actually pays off.

A third measure of financial success—average annual percentage rate of return on total assets—also was utilized in the original study, of which this article is an extension. In the original study the average annual percentage rate of return on total assets data did not support the study hypothesis. In fact, most of the banks that served as the population for this research actually suffered declines in their rates of return on total assets because of the general economic and competitive conditions in the 1970 to 1975 period. The comprehensive planners suffered the smallest decline in average annual percentage rate of return on total assets of any of the four groupings during the study period. In addition, the group of banks that were labeled as comprehensive planners moved from a position of underperforming the control group to one of outperforming the control group during the 1970-75 period.

In general, these findings suggest that large U.S. banks that develop and utilize long range plans have a competitive advantage over similar financial institutions that choose to guide their future endeavors with less formal procedures and documentations. It should not be inferred, however,

that comprehensive planning is the only reason for the superior performance of the banks studied. Rather, it is more likely that the managers of these banks were more progressive in many of their management practices.

Finally, it probably is time for researchers in this area to abandon the smorgasbord use of financial measures as dependent variables and try to match up the appropriate performance criteria with the primary objectives of the organizations being studied. Also, it should be remembered that in this type of research, there are many uncontrollable variables. Therefore, the results will always be suspect. Nevertheless, the amount of evidence in support of comprehensive long range planning for large corporations is increasing, and the research results in this area appear to be reasonably consistent.

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User Attitudes and Management Information System Use¹

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A study of an industrial sales force shows several specific attitudes to be positively related to use of a computer based information system. The results support and extend previous findings and suggest a model of information system use based on expectancy theories of job motivation.

The development and increased use of computer based management information systems (MIS) in organizations have led many researchers to investigate the problems of system users. Early published case studies (Ackoff, 1960; Quinn & Mueller, 1963; Stillson, 1963) have provided a strong impetus for management scientists and behavioral scientists to explore the causes for system failure. Probing theoretical and conceptual analyses by Ackoff (1967), Churchman and Schainblatt (1965), and Mason and Mitroff (1973) gave later investigators frameworks for research on the "implementation problem." The present high concern over implementation within the profession of management science is apparent in Wysocki's (1979) extensive classified bibliography of published work on implementation.

The basic problem may be succinctly stated: MIS can and does fail where user psychological reactions and organizational factors are ignored by system designers. Although the movement from anecdotal evidence and case studies has been slow, subsequent empirical research has supported this general position. One notion receiving attention is that attitudes of MIS users are related to their actual use of a system. Surveys and experiments show that attitudes toward various features of an MIS, systems development personnel, and computers in general are related to user behavior. Designers are urged, therefore, to create favorable user attitudes, usually through such practices as involving users in system development work.

¹The author appreciates the helpful comments of Hank Lucas and Dana Farrow.

Although such findings probably are necessary for establishing preliminary groundwork and generating interest in implementation problems, they are neither surprising nor novel. Research in this area tends to underutilize existing knowledge in the behavioral sciences and typically fails to tie "implementation" research to more general models of work behavior. Notable exceptions are Zand and Sorensen's (1975) and Ginzberg's (in press) use of the Lewin change model to study implementation of management science projects. The ultimate danger is the creation of a "new" area of inquiry in which investigators reinvent theory and learn empirical lessons through their own mistakes rather than through the experience of others.

This paper deals with this problem and addresses the relationship between user attitudes and behavior. The literature on attitudes and behavior in the MIS environment will be reviewed, and theoretical shortcomings and gaps in research findings will be identified. Data then will be presented that support the general expectations in the literature. Finally, these results and those of others will be used to develop an expectancy based model of user reaction to MIS.

PREVIOUS RESEARCH

The most extensive program of research on MIS user behavior has been that of Lucas (1973, 1974a, 1974b, 1975a, 1975b, 1976, 1978). His descriptive model (1975b) identifies five main determinants of voluntary system use: user attitudes and perceptions, technical quality of system, performance, situational and personal factors, and decision style. His basic hypothesis regarding attitudes and perceptions is stated: "Favorable user attitudes and perceptions of information systems and the information services staff lead to high levels of use of an information system" (1975b, p. 23). In developing operational definitions for the many variables in the model, Lucas generally relies upon questionnaire measures of attitudes, perceptions, and use. Scale characteristics for some of these variables are briefly described (Lucas, 1975a), indicating use of two- or three-item scales. Reliabilities are not reported. In tests of the model Lucas generally has used field surveys of managers, analyzing data by use of stepwise multiple regression. Hypotheses are accepted if predictor variables enter the regression equation with a significant beta coefficient. Tests for interaction among predictor variables are generally not performed although the model clearly leads one to expect interaction among situational and personal variables.

In summaries of six studies Lucas (1975b) supports the model's proposition on attitudes and use. Specifically he finds that *attitudes* toward the computer's potential and toward the systems staff predict use in a large number of tests across three samples. In addition, several specific *perceptions* are consistently related to use. These include: suitability of number of reports received, on-line system rating, output quality, management

support, involvement in setting goals, and compensation based on goals (1975b). From Lucas's description of the research design the distinction between attitudes and perceptions is unclear. It is obvious that the objects of attitudes are different from the objects of the perceptions, and perhaps attitudes are more general. However, the model groups attitudes and perceptions together and hypothesizes the simple relationship as cited earlier.

In a subsequent study of a computer based planning system, Lucas (1976) does distinguish between "general attitudes and perceptions" and "attitudes toward the model." The general attitudes and perceptions are: management support for modeling effort, rating of in-house computer output, involvement in developing and designing model, and potential of computer based planning systems. The specific attitudes are: few impediments to use, user interface with output, quality of data base, contribution of data base, simplicity of model, and ease of understanding model. Furthermore, general attitudes and perceptions are hypothesized to influence "attitudes toward the model." Both general and specific attitudes were significantly related to actual use.

Schewe (1976) also has devised and tested a model relating user attitudes to system use. Utilizing actual requests for MIS reports as his operational definition of system use, Schewe attempted to predict use from a wide assortment of perceptual, attitudinal, and exogenous variables. Conceptually, Schewe's model represents a theoretical step forward in the study of user attitudes in that he explicitly formulates the linkage among beliefs, perceptions, attitudes, and use. Attitudes result from a set of evaluated beliefs. These attitudes along with beliefs about exogenous factors are hypothesized to affect the degree of system usage. However, Schewe's results appear to support a more direct association between usage and perceptions of MIS dimensions, without attitudes playing a major role. He concludes that feelings of satisfaction with use of the system do not appear to influence behavior. Close examination reveals, however, that the primary distinction between attitudes and perceptions lies in the object being evaluated. Perceptions of MIS require the respondent to agree or disagree with statements about MIS characteristics (e.g., depth of information, accuracy, access time delays, etc.). Attitudinal variables require the respondent to indicate the degree of satisfaction he/she finds with consequences of MIS use (e.g., decision making effectiveness, job productivity, information usefulness, etc.). Both classes of variables, however, reflect beliefs or perceptions about some aspect of the system. Thus, one may conclude that Schewe's study does show user perceptions of the system and the environment in which the system is used to be related to actual use, but does not show attitudes toward system outcomes to be related to use.

In evaluating the Lucas and Schewe studies one must be aware of limitations in the measurement of perceptual variables. Schewe relied on single questionnaire items to measure all variables except "use" and five of the

exogenous variables. This undoubtedly affects the size and significance of resulting correlations. Although each perceptual or attitudinal item does measure something quite specific, research is likely to benefit from aggregation of items into more reliable scales. Lucas relies to a great extent on users' self-reports of system use. Although objective and self-report measures of use are often correlated (Lucas, 1976), these measures are not substitutes for each other. The overall conclusion one can derive from the Lucas and Schewe studies is that behavior is related to users' feelings or beliefs about their systems. Yet little is offered in the way of psychological explanation for the findings. It remains for other investigators to explore the full implications of their findings and to extend methodological improvements to this line of research.

With hopes of developing a more reliable measure of user attitudes, Schultz and Slevin (1975) drew a series of statements from the growing anecdotal literature on implementation. The statements were cast into a Likert-type questionnaire to measure the concerns of users of MIS, management science, and operations research techniques. In a pilot test, factor analysis of 106 responses yielded 7 factors. A total of 57 items loaded significantly (loading $> .30$) on these 7 factors. The factor names, descriptions, and examples of items are shown in Table 1. A subsequent

TABLE 1
Attitudes Measured by the Schultz and Slevin Questionnaire*

	<i>Factor Name</i>	<i>Number of Items</i>	<i>Description</i>	<i>Sample Item</i>
I.	Performance	13	Effect of system on manager's job performance and performance visibility	I have more control over my job.
II.	Interpersonal	5	Interpersonal relations, communication, and increased interaction and consultation with others	I need the help of others more.
III.	Changes	4	Changes which occur in organization structure and people dealt with	The management structure has changed.
IV.	Goals	9	Goals will be more clear, more congruent to workers, and more achievable	Company goals have become more clear.
V.	Support/resistance	11	System has implementation support; adequate top management, technical, and organizational support and does not have undue resistance	The developers of the system have provided adequate training to users.
VI.	Client/researcher	3	Researchers understand management problems and work well with their clients	I enjoy working with those who are implementing the system.
VII.	Urgency	12	Need for results, even with costs involved; importance to self, boss, top management	The sooner the system is in use, the better.

*Schultz and Slevin, 1975. All items are measured on a 5-point scale to indicate whether the respondent strongly agrees, agrees, is uncertain, disagrees, or strongly disagrees with the statement.

study by Keim (1976) supported the basic factor structure of the instrument using alternate clustering methods and additional samples. In their initial use of the instrument, Schultz and Slevin were able to find significant correlations between Factors I, IV, V, VII and perceptions of system value. However, no measures of actual use were obtained, and both dependent and independent variables were measured with the same questionnaire. Nevertheless, the development of attitude scales that isolate specific user concerns and that meet normal psychometric criteria is an important step in implementation research.

Schultz and Slevin do not make a distinction between attitudes and perceptions, nor does it seem that such a fine conceptual distinction is necessary. For these reasons, the term "attitudes" will be used here in reference to the Schultz and Slevin measures, and more emphasis will be placed on the *object* of those attitudes than on whether the measurement is of a belief, an affective response, or a perception.

The Schultz and Slevin instrument has been used to investigate a number of implementation issues. Robey and Zeller (1978) reported structural and attitudinal differences between two plants in which a quality control information system was introduced. In one plant users rejected the system; in the other it was accepted and used. Attitude Factors I (performance) and VII (urgency) differed significantly between managers in the two plants. Because the study did not focus on individual users, however, only aggregate conclusions about attitudes and MIS success can be drawn.

Robey and Bakr (1978) found several attitude dimensions to vary predictably with individual differences in work values and with time of exposure to new information technology. Again, Factors I and VII varied significantly, as did Factor IV (goals). Robey and Bakr identified an interaction between work values and exposure to a new system in determining attitudes. Respondents with intrinsic work values (Friedlander, 1965) had less favorable attitudes as their experience with the system increased, but the attitudes of respondents with extrinsic work values became more positive with experience. The authors interpret this "novelty effect" in light of the increased structure brought to the job by the system. Although *introduction* of the system was challenging (and rewarding to the intrinsic workers), *task scope* was effectively reduced. No measures of actual usage or performance at the individual level were reported.

Finally, Rodriguez (1977) used the Schultz and Slevin instrument in a laboratory study to test the effects of different implementation strategies on attitudes and use of an interactive decision support system. Attitudes I, IV, and VII were positively related to subjects' perceived worth of the system and their actual use of it. Use was measured independently by tracking the number of interactive queries of the system at the computer terminal.

From this research it can be observed that three attitudinal factors are more "volatile" than the other four. It is tempting to identify these as "key concerns" and generalize them to all implementation situations.

However, it is clear that insufficient research has been conducted to support such a conclusion. Only one of the studies using the Schultz and Slevin instrument also measured system use at the individual user level (Rodriguez, 1977). This experiment used MBA students as subjects. The only other studies reported above that assessed system use objectively were Schewe's (1976) and Lucas's (1976). The research reported in the present paper partially overcomes limitations of past research by using the Schultz and Slevin instrument to predict actual use of a system in a real-world environment.

METHOD

The sample consisted of 66 members of the sales force of a large industrial products manufacturer. These salespeople used a computer based system to record, update, and maintain information pertaining to their customer accounts. The system had been in use for 15 months prior to this study. In using the system, each salesperson was expected to initiate changes in any information pertaining to his/her customers and add new customers as required. Salespeople were urged to maintain the accuracy of the information in their customer accounts on a daily basis, although all accounts were to be updated at least once a year. Thus, use of the system was voluntary. The primary function of the system was to permit selective distribution of the corporation's product catalogs and promotional materials to its customers. Because a wide variety of industrial customers was serviced and salespersons represented many product divisions of the company, the system was implemented to achieve cost savings in distributing material to support personal selling efforts. Duplicate mailings and omissions could be controlled potentially through proper use of the system. Salesperson-users benefited from the system to the extent that the promotional materials and catalogs did support personal selling and the seller knew precisely what materials each customer had received.

Two indicators of actual use of the system were developed. First, the percentage of customer records that had to be updated annually was used as the basis for ranking users in terms of continual use of the system. If a large number of accounts required annual updating, it was assumed that the salesperson was not a continual user of the system. For reasons of confidentiality, a company staff member ranked the sales personnel in reverse order on this variable using the annual update records for the first year of system use. (Direct access by the researcher to system records was not permitted.)

A second dependent variable reflected the number of customer records maintained on the system per account. An account typically consisted of a company, and salespersons might visit many individual customers within that company (at different plants, for example). Because the number of accounts varied among sales personnel, the average number of customers per account for whom computerized records were kept was used as a more

comparable measure of use. Again, rankings on this variable were provided by corporate staff to assure confidentiality of company records.

To assess users' attitudes toward the system the questionnaire developed by Schultz and Slevin (1975), described earlier in this paper, was sent through the corporate mail to the 66 members of the sales force. Satisfactory responses were received from all 66 persons. Appended to the questionnaire were four additional questions asking the respondent to assess (1) the probability that others will use the system (10-point scale from 0 to 1.0); (2) the probability that the system will be a success (10-point scale from 0 to 1.0); (3) the overall worth of the system (10-point scale from 1 to 10 with "not useful," "moderately useful," and "excellent" as anchoring words); and (4) the level of accuracy expected from the system (10-point scale from 1 to 10 with "no accuracy," "moderately accurate," and "extremely accurate" as anchoring words). These four items were used as subjective dependent variables and were patterned after Schultz and Slevin's initial study with the attitudes questionnaire. Because of high intercorrelations among the subjective dependent variables, these items were summed and treated as a single variable, labeled "perceived worth." The reliability of this variable, as measured by Cronbach's coefficient alpha, was .84.

RESULTS

The primary objective of this research was to relate the objective measures of system use to attitudes. Table 2 shows the correlation coefficients between five attitude factors, the two objective measures of system use, and perceived worth. Factors II and III are not shown here because of low internal reliability of the subscales. The reliabilities of the remaining scales are shown in Table 2.

Clearly, the strongest associations are between performance and the use variables. Significant association between use and attitudes also is found

TABLE 2
Correlations Between Attitude Dimensions
and Dependent Variables for 66 Industrial Salespersons

Attitude Factor ^a	Scale Reliability ^b	Spearman Rank Correlations		Pearson Product-Moment Correlations
		Accounts Kept	Annual Updating	Perceived Worth
I. Performance	.81	.79***	.76***	.36**
IV. Goals	.58	.42***	.42***	.08
V. Support/resistance	.76	.78***	.75***	.31**
VI. Client/researcher	.74	.63***	.59***	.25*
VII. Urgency	.76	.71***	.67***	.35**

^aSee Table 1 and Schultz and Slevin (1975).

^bCronbach's coefficient alpha.

* $p < .05$

** $p < .01$

*** $p < .001$

for Factors IV (goals), V (support/resistance), VI (client/researcher), and VII (urgency). The correlations between attitudes and perceived worth are much lower, although four of the five are significant. Similar results are obtained when the four worth items are treated separately. (This analysis is not shown here.)

The correlations between use and perceived worth are significant ($r_s = .42$ for both use variables) beyond the .001 level. The r_s between the two measures of actual use was .97, indicating that users are very consistent in at least these two aspects of system use. Those that keep a high percentage of their customers' records on the system also update those records frequently. Conversely, users who keep fewer customer records on the system are unlikely to update those records with any frequency.

DISCUSSION

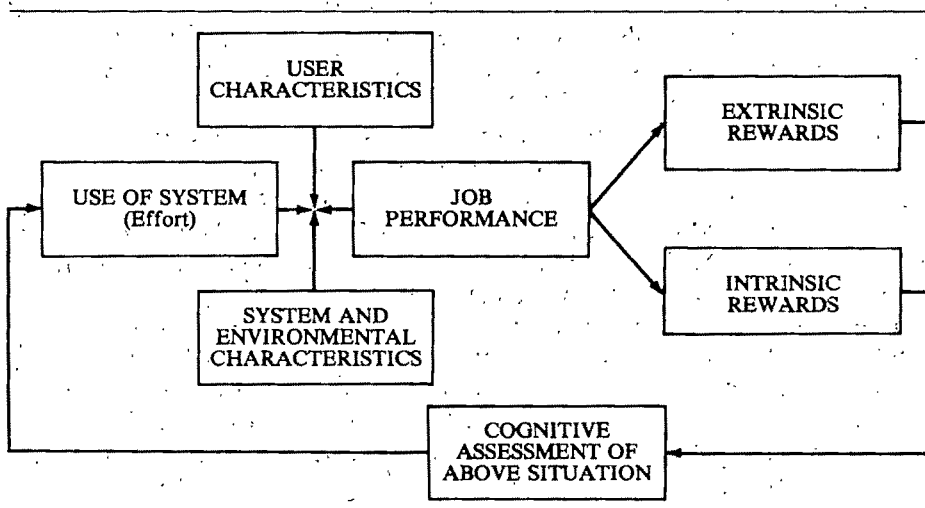
Overall, these results support the established notion that user attitudes (or perceptions) are significant correlates of system use. Attitudes are less powerful in predicting *subjective* assessments of perceived worth, although the relationships are significant. Thus, the data here generally support the basic thrust of the research discussed earlier. The finding that attitudes are more strongly related to actual use than they are to measures of perceived worth has important implications. If it is assumed that MIS designers and managers are more interested in actual usage of MIS, it seems important to focus on actual use in research. Computer logs often contain records on an individual's frequency and nature of use, and this source of data should be exploited for research purposes. Although self-reported measures of use often are highly correlated with actual use, they do not replace the need for objective, independent assessments of use. This is not to say that actual use is the only variable of interest. As Lucas (1978) observes, where system use is not optional with the user, measures of user *satisfaction* are more meaningful criteria for system success. Furthermore, neither satisfaction nor extent of use replaces user *performance* as a variable of interest. Lucas's model accurately portrays the importance of performance (e.g., decision quality) in MIS design. The relationships among performance, use, attitudes, system features, and situational variables remain as demanding research issues.

As stated earlier, one objective of this paper is to suggest a model within which user attitude research might continue more productively. The following model is based on expectancy theories of motivation as presented by Porter and Lawler (1968). Expectancy models are cognitive explanations of behavior, casting man as an active, thinking, predicting being in his environment. He continuously evaluates the consequences of his behavior and subjectively assesses the likelihood that his action will produce various results. He also is capable of evaluating outcomes or rewards and basing behavioral choices on rational analysis of the present and the past. Although empirical testing of the expectancy model seems to

pose some serious difficulties (Mitchell, 1974), it has assumed an influential role in current thinking about work behavior and management. The interpretation in the present paper is strongly influenced by Vertinsky, Barth, and Mitchell (1975), who used the expectancy model to approach implementation problems in operations research.

Figure 1 depicts a simplified version of the expectancy model as it pertains to the MIS user. It shows that the direct determinant of system use is an assessment by the user of various relationships. User perceptions or attitudes are formed concerning (1) the value of rewards received from performance, (2) the likelihood that rewards result from performance, and (3) the likelihood that performance results from use. This last component is affected by user characteristics such as ability and training and by system characteristics. Thus, job performance may decline in spite of extensive system use if the system provides inaccurate information to users. If this low performance results in lower job rewards, users are likely to reduce their use of the system and find other means to increase performance and rewards. The model also directly implies that unless rewards are contingent upon performance, use of the system will not increase even if performance depends heavily on use. There is support for this model from the research reported and reviewed here. The beginning focus will be on the use-performance relationship because this is the area on which most of the research to date has placed emphasis. Later, speculative arguments pertaining to the rewards portion of the model will be given.

FIGURE 1
Model of User Behavior



The results from the present sample show that the attitude most strongly associated with actual system use is Factor I (performance). Other research

(Robey & Zeller, 1978; Robey & Bakr, 1978; Rodriguez, 1977; and Schultz & Slevin, 1975) also has found this performance concern to be a significant correlate of implementation success. Attitude dimensions VI (client/researcher) and VII (urgency) also seem to tap concerns related to performance. System developers and support staff can make certain aspects of the system clearer to the user and can facilitate higher performance through their efforts. The urgency dimension could reflect users' concern over performance problems, which the MIS could rectify. Furthermore, Lucas's attitude variable of "computer potential" seems to imply performance concerns. This variable, too, was strongly related to use in several of the Lucas samples. The specific attitudes and perceptual variables noted by Lucas (1975b, 1976) also suggest the instrumental value of MIS to user performance. Factors such as output quality, suitability of reports, quality of data base, simplicity, and ease of understanding are clearly related to performance issues. Schewe's (1976) results linking use to variables such as quality of support personnel, response time, and search effort also indicate user concerns with performance. Stated quite simply, use of an information system depends on the user's perception of its impact on his/her performance.

The second major relationship in the model involves rewards: the extrinsic and intrinsic consequences of performance. Although there is little reason to expect formal extrinsic rewards themselves to change as a result of MIS, performance may become more visible, leading managers to tie rewards more closely to performance. Of course, this all depends on whether levels of user performance are maintained in the system. In many applications of MIS, decisions of users become part of the data base and are retrievable as a performance indicator. This capability probably further arouses the user's concern over how the system helps or hinders performance.

The data show a strong relation between concern over goals (Factor IV) and the use of MIS. This may be further evidence of the importance of performance to use, but it also suggests the importance of clear objectives. As goals become more clear, task performance increases either in direct anticipation of goal achievement or because of expected extrinsic rewards. MIS has the potential to make goals clearer and to increase job structure so that users know more completely what they need to do in order to achieve performance goals.

An area of speculation is the impact of MIS on intrinsic rewards stemming directly from task behavior. Considerable debate has transpired over the impact of MIS on tasks and user motivation (Anshen, 1960; Leavitt & Whisler, 1958). Empirical studies show that the introduction of information technology may increase task scope (Hardin, 1960; Eason, Stewart, & Damodaran, 1977) or reduce it (Robey & Bakr, 1978; Whisler, 1970). Research on task scope also suggests that individual preferences must be accounted for before the motivational consequences of task changes can be predicted (Pierce & Dunham, 1976). It is likely that changes in task

scope and intrinsic rewards will have some impact on use, however. Schewe's (1976) data show that change in job content is the most important predictor of use of an interactive (on-line) MIS, although the *direction* of change is unclear. At present, the Schultz and Slevin scales on task and other changes are not sufficiently reliable to detect concerns in this area, at least in the tests conducted so far.

The model presented here is tentative at best and is only implied from the research in this article. It is a preliminary attempt to place research on MIS implementation in perspective to consider it as a special case of job behavior that can be potentially explained by existing models. Further testing should take advantage of previous research on expectancy theory to avoid the many pitfalls already encountered by expectancy researchers.

In returning to the more direct implications of this research, it is important to note its limitations. First, although the Schultz and Slevin instrument appears to be superior to single-item scales used elsewhere, it has not received extensive validation. Factor structures have varied somewhat across samples (Keim, 1976), and there is some conceptual overlap among factors. As researchers in the implementation area see the value of expectancy or other models to guide their research, instrumentation should be drawn from those contexts. Second, a word of caution must be extended to those interpreting these results and the results of any cross-sectional study. Strong positive relationships have been demonstrated between specific user attitudes and actual use of an MIS. It does not necessarily follow, however, that attitudes *cause* behavior. It is just as logical to argue that use of the system is instrumental to attitude formation, and correlational data support either position. Before causation can be demonstrated, controlled laboratory studies (Rodriguez, 1977), longitudinal field studies (Lucas, 1978), and field experiments need to be conducted. Finally, this study may be affected by a limited range in the dependent variables of actual use. As noted, ranks were provided by a company representative in order to preserve record confidentiality. The actual distribution of use remains unknown.

Beyond these suggestions for future research, what practical implications may be drawn from this study? The importance of user attitudes to system usage has been restated strongly. User concerns are critical to success of MIS, particularly concerns about the impact of MIS on individual performance. Obviously, these concerns should be addressed during implementation, but in some cases it may be too late by then. A system that does not help people perform their jobs is not likely to be received favorably in spite of careful implementation efforts. A system that reduces rewards for users is likely to meet with disaster. A logical and often recommended approach to systems design is to involve users in the design effort. This appears to be one valid method of addressing user concerns over performance and rewards before irretrievable investments are made in design efforts. Systems designers and implementation teams would be well advised to find some means of addressing these concerns during MIS development.

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Characteristics of Career Planners in Upwardly Mobile Occupations

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Career variables of 277 municipal employees of a large southwestern city in upwardly mobile occupations were surveyed with a questionnaire instrument. Analysis of the collected data revealed that individuals with the most effective careers reported more extensive career planning. These results are discussed in light of the current literature.

Interest in career development and career planning, in particular, is on the upswing among practitioners and academicians alike. Several authors (e.g., Hall, 1976; Jennings, 1971; Bolles, 1972) have pointed to the need for individual career planning. Several public and private organizations are experimenting with formal career planning programs (Walker, 1978). The objectives of these programs are to increase the extent of personal career planning, which could lead to more effective careers. Hall (1976) argues that employee career effectiveness is directly related to organizational effectiveness and that career planning activities can lead to a more committed work force. Most of the supporting evidence for justifying career planning has come from personal experience and case histories. The area is noticeably lacking in carefully designed research studies (Super & Hall, 1978) that could provide a basis for implementing or rejecting the intuitively appealing claims in favor of career planning programs.

The present study investigates the characteristics of employees of a large public organization who report that they have developed a plan for their career and a strategy for achieving the plan. By considering the characteristics of individuals who, on their own initiative, engage in career planning activities, it may be possible to gain insight into the relationship between career planning and career effectiveness. Further, these characteristics may provide information for practitioners to use in selecting employees who would have a greater tendency for success in a formal career planning program.

Hall (1976) defines career effectiveness in terms of four criteria: (1) performance, (2) attitudes, (3) adaptability, and (4) identity. Career performance has been measured in numerous ways. Salary and position (or level in the organization) are two of the most common methods. Attitudes refer to the favorableness with which the career is viewed. This usually is expressed by a high degree of involvement in the career. Adaptability refers to how readily an individual copes with change and how readily he/she can keep abreast in the particular field. The identity component refers to awareness of one's own abilities, values, and interests. Hall (1976) refers to this self-awareness as identity resolution. If career planning is a means of facilitating career effectiveness, then individuals higher in the career effectiveness dimensions should report a greater extent of career planning than do persons lower in the career effectiveness dimensions.

Hypothesis 1. Dimensions of career effectiveness—(1) career performance (salary and level), (2) career involvement, (3) adaptability, and (4) identity resolution—will be positively related to the extent of career planning.

PERSONAL CHARACTERISTICS

Rotter (1966) argues that individuals vary in their perception of the extent to which they have control over their future outcomes. According to Rotter a person with an external locus of control (an external) believes that most of what happens to him is outside his own control. Conversely, a person with an internal locus of control (an internal) believes that most of what happens to him is a direct consequence of his own behavior. Locus of control may impact or moderate certain career decisions. For example, Liberty, Burnstein, and Moulton (1966) found that externally controlled males preferred occupations high in status but requiring relatively low levels of competence, and internally controlled males preferred occupations with lower prestige relative to competency requirements. They concluded that although externals desire status, they may not feel that they can attain it through their own efforts. Gable, Thompson and Glanstein (1976) found internals to be higher in vocational maturity than were externals. Lefcourt (1966), in a review of the locus of control literature, concluded that internals are more likely than are externals to expend effort to improve their own life patterns. It appears logical to hypothesize then that internals will be more likely to report higher career planning than will externals.

Hypothesis 2. Internals will report more extensive career planning than will externals.

Self-esteem also has been shown to play a role in career decisions. Korman (1967) found self-esteem to moderate the relationship between vocational choice and self-perceived ability. Bartlett (1968) reported a positive correlation between vocational maturity and self-confidence. Hall (1976) argues that persons higher in self-esteem seek more accurate information

about themselves and hence have greater self-awareness. Crites (1971) has found vocationally mature students to be more goal directed than are students low in vocational maturity.

Self-esteem also plays a key role in Hall's (1971) model of career growth. This model suggests that career growth occurs in cycles. As people achieve personal career goals that are important to their self-concept, they experience psychological success. This leads to growth in one's career subidentity and a corresponding increase in self-esteem and career involvement. This increases motivation to set further career goals. Hence, the evidence indicates that self-esteem is related to vocational maturity and goal directedness as well as to the achievement of career goals. If career planning indeed facilitates the achievement of career goals, then those persons higher in self-esteem should be more likely to report greater career planning.

Hypothesis 3. The level of self-esteem will be positively related to the extent of career planning.

Sex also may have a bearing on the level of career planning. Crites (1976) reports that female high school seniors consistently score higher than do high school males in career maturity. If it is assumed that people higher in career maturity are more likely to plan their careers, which seems reasonable, the tendency may not continue into later years. Veiga (1976) reports that women engage in less career planning than do men. They tend to have more of a "here and now" orientation relative to their career concerns. Deaux and Emswiller (1974) report that women are more likely than men to attribute their successes to sources external to themselves, such as luck or task attributes, and men are more likely to attribute their successes to internal sources such as skill and effort. This finding would seem to indicate that women would have less motivation to engage in career planning activities.

Hypothesis 4. Males will report more extensive career planning than will females.

Individuals' tenure in an organization could impact the extent of their career planning. There is substantial evidence to suggest that the first few years in an organization are devoted primarily to learning the ropes, establishing peer relationships, and developing important work related skills (Schein, 1968; Van Maanen, 1977; Hall, 1976; Hall & Nougaim, 1968). During these first years the employees may be too involved in modeling or understanding their work world to engage in career planning (Van Maanen, 1977). In about two years, this first stage gives way to a period of rapid advancement (Hall & Nougaim, 1968). During this period the employees set goals and objectives based on their concept of social time, i.e., how far and how fast they are likely to advance (Van Maanen, 1977). It is during this time that career planning should be at its height. After eight to ten years, a period of stability is entered during which little "new ground is plowed," but there is an attempt to maintain one's past achievements (Hall & Nougaim, 1968). During this period career planning

would be expected to decline as the rate of advancement slows and hence the need for planning declines.

Hypothesis 5. Career planning will be lowest among individuals with two or less years of service in the organization. It will be highest for those with greater than 2 but less than 10 years in the organization.

Age may have an impact on career planning similar to that hypothesized for tenure. Super (1957) has proposed developmental career stages, which have received some empirical support (e.g., Hall & Mansfield, 1975). Super proposes the following stages that are relevant to the current discussion.

1. Exploration (age 15-24). During this turbulent stage there is self-examination, role tryouts, part time jobs, etc., which prepare the individual for making a career choice.
2. Trial (age 25-30). Once a vocation is chosen, several jobs may be tried out until the right organization is found. Vocational choices may be revised.
3. Stabilization (age 31-44). This is a period of stable growth during which one attempts to secure a permanent place in his vocation.
4. Maintenance (age 45-65). Little new ground is broken. Old patterns are continued.

From Super's description, it is likely that the early career years may be too turbulent and unpredictable for effective planning. The stabilization period appears to offer the greatest incentive for planning. Once planning is established, it may carry over into the maintenance stage. This latter stage of planning may be centered more around retirement than career as the later years are approached.

Hypothesis 6. Career planning will be highest in the stabilization stage and lowest in the exploration and trial stages.

A final personal characteristic that may impact the extent of career planning is one's level of formal education. Higher formal education exposes a person to abstract conceptualization and decision making skills. These factors may be helpful in the planning process. However, even more important perhaps, is that higher educational attainment increases one's occupational opportunities (Blau & Duncan, 1967; Slocum, 1974). Hence, the greater the level of formal education, the greater the need for career planning, and thus the greater the extent of career planning.

Hypothesis 7. Level of formal education will be positively related to the extent of career planning.

METHOD

A study was made of 277 municipal employees in upwardly mobile occupations of a large southwestern city. They were surveyed in groups ranging in size from 23 to 48 over a one week period. The data gathered were part of a larger survey of career related attitudes, which included 453

employees in total. For the purpose of this study, subjects who reported an occupation in one of the following categories were not included in the analysis: (1) laborer/service worker, (2) equipment operator/driver, (3) craftsman, and (4) clerical worker. Workers in these occupations generally experience a horizontal career pattern with little upward mobility. Hence they were excluded from the analysis.

The occupations included fall among the following categories: (1) technicians, (2) sales workers, (3) professionals, and (4) managers/administrators. The average subject was 38.5 years of age, had worked for the city for 10.1 years, and earned a salary of \$13,600.45 per year. The mean education was slightly greater than two years of college. Subjects were assured that their questionnaire data would be treated in confidence and that only aggregate statistics would be reported to their management. Sample statistics compared favorably with data characteristics of the city employees, indicating that the sample was representative of the population from which it was drawn.

Age, tenure, education, and sex were determined by asking a single, objectively worded question. The remaining variables were measured using scales formatted in a 6-point Likert style. The statements were anchored at the bottom by "strongly disagree" and at the top by "strongly agree." All statements were dispersed throughout the questionnaire to avoid artificially high reliabilities due to the grouping of like items.

The extent of career planning was tapped by inquiring into (1) the extent to which career plans exist, (2) how frequently career plans are changed, (3) how clear the plans are, and (4) whether or not a strategy exists for achieving career goals. The organization studied did not have a formal program for assisting individuals with their personal career planning. It was felt that a high score on this scale would be indicative of self-initiated career planning activities among the subject. Coefficient alpha computed for this scale was .80, indicating an acceptable level of internal consistency. The author tested this measure on three separate groups of subjects. Coefficient alpha was above .70 for each group. Hence the scale appears to be internally consistent over several administrations.

The level of career involvement was assessed with an 8-item scale. This scale was designed to tap the extent to which one's career is a central part of one's identity. Coefficient alpha for this scale was .83.

Identity resolution was measured using a 4-item scale. This scale indicates the extent to which individuals clearly understand their own values, interests, and capabilities. Coefficient alpha for this measure was .66.

Adaptability was measured with a 3-item scale. The scale is designed to determine the ease with which individuals adapt to changes in their jobs. Although the scale appears to have high face validity, the internal consistency computed for the scale was lower than desired (coefficient alpha = .57), yet within the level acceptable for research purposes (Nunnally, 1967).

The four career scale items developed for this study (i.e., those pertaining to career planning, career involvement, identity resolution, and adaptability) were subjected additionally to a factor analysis (principal factor with iterations). The rotated four-factor solution is reported in Table 1. For the most part, the scale items loaded as anticipated. The only exception is the fourth item under identity resolution, which loaded nearly equally on factors 2 and 3. This item was included in factor 3. The pattern of factor loadings provides reasonable support for the use of these scales.

TABLE 1
Career Variables Rotated Factor Matrix

Item	Factor			
	1	2	3	4
<i>Career planning items (coefficient $\alpha = .80$)</i>				
1. I have not really decided what my career objectives should be yet (reverse).	-.17	.57	-.03	-.07
2. I have a plan for my career.	.11	-.71	.16	.06
3. I have a strategy for achieving my career goals.	.11	.63	.17	.14
4. I know what I need to do to reach my career goals.	.09	-.51	.25	.06
5. My career objectives are not clear (reverse).	-.25	.58	-.06	-.06
6. I change my career objectives frequently (reverse).	-.29	.49	-.19	.03
<i>Career involvement items (coefficient $\alpha = .83$)</i>				
1. I identify strongly with my chosen line of work.	.67	-.18	.32	-.03
2. My chosen line of work gives me a sense of well-being.	.62	-.08	.32	.09
3. I get a sense of pride from my chosen line of work.	.71	-.19	.23	.09
4. I am sometimes dissatisfied with my choice of career fields (reverse).	-.57	.34	.10	-.15
5. Compared to other areas of my life, my chosen line of work is not very important to me (reverse).	-.54	.36	-.09	-.08
6. Sometimes I wish I had chosen a different career field (reverse).	-.58	.35	.07	-.24
7. If I were to describe myself to someone, I would probably begin by stating my line of work.	.36	-.05	.04	-.10
8. If I were to rank (in importance to me) all the things that I do, those things related to my line of work would be at or near the top.	.52	-.12	.20	-.04
<i>Identity resolution items (coefficient $\alpha = .66$)</i>				
1. I clearly understand my capabilities.	.17	.16	.60	.09
2. I often feel confused about who I am as a person (reverse).	-.13	.26	-.36	-.11
3. I have a strong sense of personal identity.	.16	-.13	.61	.21
4. I know what I want out of life.	.19	-.33	.35	.05
<i>Adaptability items (coefficient $\alpha = .57$)</i>				
1. I like to try new and different things in my job.	.00	-.05	.21	.46
2. I do not like having to adapt to new and changing job conditions (reverse).	.00	.14	.04	.63
3. I adapt easily to changes in my job.	.05	-.04	.14	.53
Eigenvalue	6.13	1.85	1.61	1.39

Career performance was determined by asking subjects to indicate their current monthly salary and current level in the organizations. Level was scored 1 for nonsupervisors, 2 for first level supervisors, 3 for division heads and assistant division heads, and 4 for department heads and assistant department heads.

Locus of control was tapped with a 6-item scale based on Rotter's (1966) distinction between internals and externals. Coefficient alpha for this scale was .68.

Self-esteem was measured by four items based on Rosenberg's (1965) scale. Coefficient alpha for this scale was .68.

RESULTS

The means and standard deviations of each of the variables are reported in Table 2. Zero order correlations between the variables are reported in Table 3. In addition, each of the variables was entered into a stepwise regression procedure with career planning as the dependent variable. The justification for this model lies in the cyclical nature of career growth discussed earlier. Hence, although measures of career effectiveness may appear to be outcomes of career planning in one sense, they also can be considered as reinforcement for past career planning and therefore as a means for motivating continued career planning activity. The statistics from the regression analysis are summarized in Table 4. Only those variables that entered the regression with a significance level of $\alpha = .10$ or less are reported.

TABLE 2
Means and Standard Deviations
for Variables

<i>Variable</i>	<i>Mean</i>	<i>Standard Deviation</i>
Career planning	25.53	4.30
Career involvement	36.33	7.01
Identity resolution	20.73	2.67
Adaptability	14.05	2.57
Locus of control	16.16	5.30
Self-esteem	20.76	2.12
Tenure	10.11	7.96
Age	38.53	10.85
Education	5.12	1.27
Level	1.86	.80
Salary	13600.45	4893.44
Sex	1.20	.40

Hypothesis 1 suggested that each of the measures of career effectiveness (i.e., career performance, career involvement, adaptability, and identity resolution) would be positively related to the extent of career planning reported. The zero order correlations support this hypothesis. Table 3 indicates that career planning was positively related to salary ($r = .19$, $p < .01$), level in organization ($r = .12$, $p < .05$), career involvement ($r = .49$, $p < .001$), adaptability ($r = .25$, $p < .001$), and identity resolution ($r = .43$, $p < .001$). Further, when these variables were included in a stepwise multiple regression, each of the four dimensions significantly contributed to differentiating the extent of career planning among subjects of this sample. Table 4 reports the following beta weights: salary ($\beta = .17$, $p < .01$), career involvement ($\beta = .33$, $p < .001$),

TABLE 3
Zero Order Correlations

	1	2	3	4	5	6	7	8	9	10	11
1. Career planning	.49***										
2. Career involvement	.43***	.40***									
3. Identity resolution	.25***	.18**	.25***								
4. Adaptability	.29***	.37***	.30***	.23***							
5. Locus of control	.34***	.25***	.50***	.28***	.15*						
6. Self-esteem	.09	.08	.01	.14*	-.02	-.04					
7. Tenure	.11	.09	-.01	.11	-.01	.05	.38***				
8. Age	.01	.10	-.07	.05	.06	.07	-.24***	-.11**			
9. Education	.12*	.12*	-.06	.05	.14*	-.03	.22***	.27***	.21***		
10. Level	.17**	.11	-.10	-.09	-.04	-.05	.48***	.44***	.14*	.55***	
11. Salary	.08	.02	-.02	.09	-.03	.04	-.18**	-.09	.08	.00	-.25***

* $p < .05$ ** $p < .01$ *** $p < .001$

TABLE 4
Stepwise Multiple Regression
Dependent Variable: Career Planning

<i>Independent Variable</i>	<i>R</i>	ΔR^2	R^2	<i>Standard Error of the Estimate</i>	<i>Beta</i>	<i>F to Enter</i>	<i>Significance</i>
Career involvement	.49	.24	.24	3.751	.33	37.34	$p < .001$
Identity resolution	.55	.31	.07	3.589	.23	15.20	$p < .001$
Salary	.58	.33	.02	3.528	.17	12.29	$p < .01$
Adaptability	.59	.35	.02	3.486	.12	5.67	$p < .05$
Self-esteem	.60	.36	.01	3.469	.11	3.71	$p < .06$

adaptability ($\beta = .12$, $p < .05$), and identity resolution ($\beta = .23$, $p < .001$). These variables were the first to enter the stepwise multiple regression. Hence Hypothesis 1 received strong support in this study.

Hypothesis 2 submits that career planning will be greater among internals than among externals. The locus of control scale is unidimensional. Internals score low on the scale and externals score high. Hence a negative relationship between career planning and locus of control would support this hypothesis. Table 3 shows that the zero order relationship attained was $r = -.29$ ($p < .001$), which supports the hypothesis. However, in the multiple regression, the beta weight for locus of control failed to reach significance. Although the hypothesis is supported with the zero order correlations, the effects of locus of control were minimal when the other variables were included in the regression equation.

Hypothesis 3 proposes that self-esteem will be positively related to the extent of career planning reported. This hypothesis was supported by the zero order analysis ($r = .34$, $p < .001$) and was marginally supported in the multiple regression analysis ($\beta = .11$, $p < .06$). Therefore, Hypothesis 3 received marginal support in this study.

Hypothesis 4 states that males would report a greater extent of career planning than females. This was not supported in the zero order analysis ($r = -.08$, N.S.), nor was sex significant in the multifactor analysis.

Hypothesis 5 suggests that subjects with 2 to 10 years of service will report the greatest extent of career planning and that subjects with less than 2 years will report the least career planning. This hypothesis was tested using analysis of covariance. This technique was used to test for tenure group differences while controlling for the effects of age. The F value for the main effect was 2.26 ($df = 2/273$), which was not significant. The results of this analysis indicated that when age was controlled, there was no support for the notion that the extent of career planning differed among the tenure groupings. Hence, Hypothesis 5 was not supported.

Hypothesis 6 states that the extent of career planning may vary with career stage based on age groupings proposed by Super (1957). Specifically, career planning was hypothesized to be highest during the stabilization stage (age 31-44) and lowest during the exploration (age 15-24) and trial (age 25-30) stages. Again, analysis of covariance was used to test the hypothesis. This time tenure was controlled. The F value for the main



effect was .72 ($df = 2/273$), which was not statistically significant. Thus, Hypothesis 6 was not supported.

According to Hypothesis 7, the extent of career planning is directly related to the level of formal education. This hypothesis did not receive support from the zero order analysis ($r = -.01$, N.S.). Further, the relationship was not significant in the multifactor analysis. Education was not found to be related to the extent of career planning in this study.

DISCUSSION

The objective of this study was to investigate the relationship between the extent of career planning and (1) career effectiveness variables, (2) personal variables (age, tenure, education, and sex) and (3) psychological variables (locus of control and self-esteem). The results indicated that individuals higher in the career effectiveness dimensions (salary, career involvement, identity resolution, and adaptability) reported more extensive career planning. Self-esteem was marginally related to career planning. Internals reported greater career planning. However, this variable did not discriminate between levels of career planning when the effects of other variables were included in a multiple regression procedure.

The hypothesis that males would engage in more extensive career planning than females was not supported in this study. There could be several explanations for this result. For example, recently a great deal of self-help material has been aimed at women such that sex differences may no longer exist. Another explanation could be that previous research (e.g., Viega, 1976) may not have differentiated between women in upwardly mobile and non-upwardly mobile occupations. Many working women are still confined to clerical jobs that may provide a little incentive for career planning. If female subjects are more heavily represented in these nonmobile occupations than are the male subjects, it is likely that women would report less planning.

Several hypotheses were advanced on the premise that certain groups would have a greater need for career planning and therefore would be more likely to engage in this activity. For example, those with a higher formal education were surmised to have a greater number of opportunities and hence a greater need for planning. Also, individuals with 2 to 10 years in an organization (Hall and Nougaim's, 1968, advancement stage) or in the age bracket of from 30-44 (Super's, 1957, stabilization stage) were predicted to have a greater need for planning. These seemed to be the more dynamic periods when the greatest career advancement was likely to occur. However, the anticipated greater career planning was not reported by these groups in the present study. Business executives, another group with many opportunities and supposedly a high need for career planning, were found in an earlier study (Roe & Baruch, 1967) to be remarkably passive and reactive in their career planning, often letting the work environment determine the course of their careers. One explanation for this

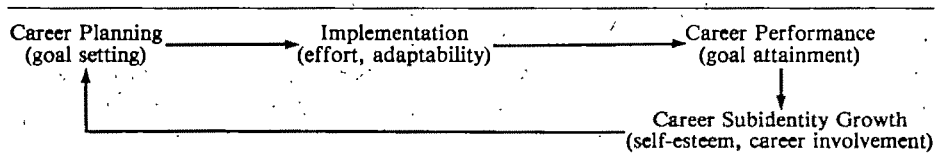
finding is that the need for career planning and the extent of career planning are unrelated. Career planning activities may be more closely related to personal planning skills, certain psychological characteristics (e.g., self-esteem and identity resolution), past reinforcement for career planning (e.g., measures of career effectiveness), and the complexity of the career environment. Additionally, the individual whom others might consider to have a high need for career planning may not perceive this need. Without perceiving the need, or lacking the appropriate skills for planning, the individual undoubtedly would lack such planning. Even though these groups with a high need for career planning do not report more extensive planning, it is logical to believe that they may have the most to gain by doing so.

It would be convenient for those advocating career planning programs to conclude that career planning will lead to greater career effectiveness, but the current correlational research design does not permit one to draw this conclusion. Clearly a next step needed in this area of investigation is a well-designed field experiment that can demonstrate either the success or failure of career planning in facilitating career growth and effectiveness.

Hall and Foster (1977) propose a psychological success model of goal setting that may be used to illustrate the career planning process. The Hall and Foster model is recursive in nature. It proposes that goal setting is followed by an expenditure of effort, which in turn leads to relatively high performance. This higher performance leads to an increase in self-esteem and greater involvement. Higher involvement then is followed by a high motivation for setting further goals.

The model presented in Figure 1 is an adaptation of the Hall and Foster model, which is consistent with the results of this study. In Figure 1, career planning is equated to the goal setting function in the Hall and Foster model. Implementation of career plans is equated to the exertion of effort.

FIGURE 1
Career Planning Model



The career planning model in Figure 1 asserts that career planning will be followed by efforts to implement the plan. These efforts lead to higher career performance, which in turn enhances self-esteem and career involvement. This results in growth of the career subidentity (Hall, 1971). The increased career subidentity reinforces the planning function. Again, the model is cyclical.

The career planning model has implications for practicing managers and suggests questions for further research. For example, it would appear that

those individuals who would gain the most from career planning activities would be individuals who have high growth and achievement needs. It suggests further that if career planning is to be successful, the individual must possess sufficient implementation skills to ensure success. Further, managers may need to follow up career planning activities with supportive counsel to ensure that unanticipated barriers do not unnecessarily limit implementation success. These implications are suggestive at this point. Experimental and longitudinal research designs are needed for further investigation of these and other implications.

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Effects of Job Peripherality and Personal Characteristics on the Job Satisfaction of Part Time Workers¹

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Sixteen groups of part time employees in a retail sales organization were created by classifying employees by the number of hours they worked per week and whether they were employed on a seasonal or steady basis. The groups showed different demographic profiles and levels of job satisfaction, but their patterns of job satisfaction were similar. When the relationships between demographic and attitudinal variables were statistically controlled, the effect of peripheral attachment and participation in the work force on job attitudes was virtually eliminated.

In 1976, 48 million workers in the United States did not choose or were not permitted to devote the standard amount of time to work. (Young, 1977). Known as peripheral workers because of their part time or intermittent work experience, they represent 46 percent of the entire work force. This proportion of the labor force has remained stable since 1960, when 46 percent of the work force was composed of peripheral workers (Morse, 1969). Moreover, the percentage distribution of all workers by hours and weeks has varied only slightly during this period (Morse, 1969; Young, 1974, 1975, 1976). Of persons who worked during 1976, 24 percent worked full time (i.e., 35 hours per week or more) but fewer than 50 weeks during the year (Young, 1977). Part time employees (who work fewer than 35 hours per week) accounted for another 21.5 percent of the work force, and approximately two thirds of these part time workers were employed less than a full year (defined as fewer than 50 weeks of employment). Finally, as is true of the total labor force, the population of peripheral

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workers is growing in absolute size, both in the United States and in other industrialized nations (Evans, 1975).

Part time and/or intermittent work experience is not randomly or equitably distributed among the working population (Morse, 1969). Rather, the supply of peripheral workers is drawn in disproportionate numbers from certain demographic subdivisions of the society. Women, nonwhite minorities (blacks constitute 90 percent of the nonwhites), teenagers, and older persons (in particular, those 65 years and older) contribute disproportionately to their representation in the labor market—more than their share—to the part time work force. [Except for racial minorities, this demographic composition of American part time workers is similar to that of European part time employees (Hallaire, 1968).] For instance, in 1965, females between the ages of 25 and 54 accounted for 30 percent of the part-time work population but were only 22 percent of the total working population (Morse, 1969). On the other hand, only 2 percent of the part time labor force were white males aged 25 to 54, although they represented 22 percent of all workers. Similarly, each of the four demographic subpopulations is overrepresented among part year, full time workers, and white males in the prime work years are underrepresented. For example, in 1965, the share of the intermittent full time work population was 26 percent by working women in the central age period (25 to 54 years of age), whereas the proportion of employed white men in the same age category was 6 percent (Morse, 1969). Moreover, women and youths constitute the bulk of the total supply of the peripherally employed (Gilroy & Bradshaw, 1974). Four fifths of part time workers and three quarters of part year, full time workers consisted of women and youths in 1965 (Morse, 1969).

Further, peripheral workers—often considered the partially unemployed—experience greater unemployment problems than do year-round, full time workers (Gilroy & Bradshaw, 1974). It also is worth noting that part time workers who took part time jobs because they were unable to find full time work or who had their work week cut below 35 hours because of adverse economic factors (numbering nearly three million in 1974) are especially vulnerable to the health of the economy and labor market conditions (Bednarzik, 1975). Bednarzik (1975) has demonstrated that, like the unemployment rate, the incidence of “involuntary” part time work moves in a stable relationship to the business cycle.

The employment of peripheral workers is concentrated in a small number of industries (Morse, 1969). Part time workers are found predominantly in three sectors of the economy: agriculture, retail sales, and some of the service industries. On the other hand, few part time workers are employed in large scale manufacturing plants, public utilities, or government bureaucracies. Retail trade, agriculture, construction, and medical and educational industries hire a substantial proportion of the full time workers who work less than a full year. In addition, just as both kinds of peripheral workers cluster disproportionately in certain areas of

the economy, so do they cluster in certain occupations (Morse, 1969). Part time workers are primarily private household workers, farm workers, retail salespersons, general laborers, clerical workers, and waiters, cooks, and bartenders (Klein, 1973). Stenographers and other clerical workers, operatives, service workers, and laborers describe the occupational composition of intermittent, full time workers. Generally, jobs that peripheral workers engage in require little skill and pay low wages. Further, contributing to their peripheral work status is the low educational attainment of peripheral workers, and perpetuating their peripherality is the little job training and few or nonexistent fringe benefits they receive from their employers and the absence of union representation for them (Morse, 1969).

Although the objective qualities of the peripheral work experience are well documented, the subjective elements of peripherality have largely been ignored (Morse, 1969). Only a few psychological studies have specifically examined the peripheral work population. In a survey of part time supermarket checkers, Gannon and Nothorn (1971) found personality traits and age to be related to company tenure. That is consistent with past research on full time employees (Porter & Steers, 1973; Schuh, 1967), but job satisfaction measures failed to differentiate between short term and long term part time checkers, which suggests differences between part time and full time employees in the predictors of the length of service in an organization. [Job satisfaction is a well-established correlate of job tenure (Herzberg, Mausner, Peterson, & Capwell, 1957).] Logan, O'Reilly, and Roberts (1973) compared full time with part time hospital personnel. Demographic profiles of both samples were similar, as were their levels of satisfaction with various aspects of the work environment. However, the patterns of satisfaction (i.e., the intercorrelations among satisfaction measures and the factor structure) of the two groups were dissimilar. Full time employees included promotional opportunities as an integral part of overall satisfaction with their jobs, but the part time employees excluded such opportunities. The nature of work satisfaction also was defined differently by the two groups of workers. Full time workers perceived their work in terms of multiple facets of job satisfaction; part time workers defined the nature of their work satisfaction solely in terms of co-worker satisfaction. Finally, a comparison among married women who were either full time employees, part time employees, or full time housewives revealed that part time employees felt more role conflict and greater home pressures than did the other two groups of women (Hall & Gordon, 1973). Part time working women also reported greater role overload and lower satisfaction than did married women who were either full time housewives or full time workers.

The purpose of this investigation is to advance the understanding of the psychological aspects of peripheral work. Part time workers who differ in the extent of their peripherality in the work force will be compared. The attitudinal differences (in level and in pattern) between full and part time

employees—noted in the three psychological studies—may be a function of their differential attachment and commitment to work, the most committed participants in the labor force being year-round, full time employees. Analogously, part time employees differing among themselves in terms of their commitment and participation in the work force also may show dissimilar job attitudes. More specifically, job satisfaction may differ in level and in patterning among part time workers who are classified on the basis of two indices of degree of (part time) employment in an organization: (1) the number of hours worked per week and (2) steady versus seasonal employment, i.e., continuous work or work only during certain times of the year. (These measures also index the degree of participation in the labor force. In the organization studied here, the overwhelming majority of part time workers had only one job. Of the sample of 10,003 part time employees, only 895 had a full time job elsewhere, and 337 had another part time job.)

Similarly, the difference in demographic makeup between full year, full time workers and peripheral workers suggests that the demographic compositions of workers in diverse kinds of part time jobs (that vary in peripherality) may also be expected to differ. Because demographic variables are related to job satisfaction (Herman & Hulin, 1972), and because they also may be confounded with the nature of the part time job [demographic variables are correlated with other indices of an employee's position in the organizational structure (Herman, Dunham, & Hulin, 1975)], another concern addressed by this study is whether the peripherality of part time workers continues to be related to job attitudes once demographic characteristics are controlled (statistically). In other words, relationships obtained between job attitudes and work peripherality may be spurious, and after the demographic dissimilarities among different types of part timers are held constant, their differences in job satisfaction may be substantially reduced.

METHOD

Data were collected from 10,003 part time employees from 84 stores, plants, and offices of a large merchandising organization. Their job attitudes, their demographic characteristics, and the nature of their part time employment in the organization were assessed. Satisfaction with supervision, work, co-workers, and pay were measured by the Index of Organizational Reactions (IOR) (Dunham, Smith, & Blackburn, 1977). One-item IOR scales measured company identification, satisfaction with the physical conditions of work, satisfaction with the amount of work, and job security. (For a description of the demographic measures, see Table 3.)

Discriminant analysis was conducted for demographic variables (nominal scales were dummy coded) on groups of part time workers who were simultaneously classified on the basis of the number of hours they

worked per week and whether they were steady or seasonal workers. (These two indices of the degree of part time employment in the firm were uncorrelated.) A description of these groups is found in Table 1.

TABLE 1
Description of Groups Used in Discriminant Analysis

<i>Group Number</i>	<i>Group Definition</i>	<i>N</i>
1	Steady—fewer than 6 hours/week	45
2	Steady—6 to 10 hours/week	161
3	Steady—11 to 15 hours/week	629
4	Steady—16 to 20 hours/week	2,008
5	Steady—21 to 25 hours/week	2,630
6	Steady—26 to 30 hours/week	2,819
7	Steady—31 to 35 hours/week	91
8	Steady—36 to 40 hours/week	212
9	Seasonal—fewer than 6 hours/week	20
10	Seasonal—6 to 10 hours/week	32
11	Seasonal—11 to 15 hours/week	30
12	Seasonal—16 to 20 hours/week	93
13	Seasonal—21 to 25 hours/week	121
14	Seasonal—26 to 30 hours/week	217
15	Seasonal—31 to 35 hours/week	13
16	Seasonal—36 to 40 hours/week	31

Statistical significance of the discriminant functions was tested by Bartlett's *V* statistic (Tatsuoka, 1971). The power of the discriminant solution—how much of the total variance in the dependent measures was due to group differences—was estimated using the multivariate analogue of omega-squared (Tatsuoka, 1970). The proportion of discriminatory power attributable to each discriminant function was estimated by the ratio of the function's eigenvalue to the sum of the eigenvalues for all functions. Interpretation of the relative importance of each dependent variable's contribution to the separation of groups on the discriminant functions was made from the structure matrix (Cooley & Lohnes, 1971). The (standardized) discriminant function weights also will be presented.

In order to determine the effect of job peripherality on the pattern of relationships among attitudinal measures, the (eight) measures of job satisfaction in each group of part time employees were factor analyzed (principal factor method), using multiple correlation squared as communality estimates. Two factors in each group's factor solution were extracted and rotated orthogonally (varimax). Application of a scree test (Harman, 1976) to a preliminary factor analysis of the correlation matrix of satisfaction variables in the population ($N = 10,003$) indicated that two factors adequately explained the interrelationships among the variables (eigenvalues were 2.32 and .17). Coefficients of congruence between factors from different groups were computed (Harman, 1976), and comparisons among the 16 groups of part time workers as to the similarity of their factor structures were made.

Finally, the relationship between the demographic (predictors) and satisfaction (criteria) variables was estimated by using a canonical regression procedure. In lieu of examining the canonical weights to interpret the canonical correlations and to determine the relative importance of each variable to its derived canonical variate, an alternative method was used (Meredith, 1964). Meredith's method, which is not severely affected by the intercorrelations among variables in a given set, requires a correlation matrix (structure matrix) between scores on the canonical variates and scores on individual variables (Cooley & Lohnes, 1971) and shows greater stability under cross validation (Thorndike & Weiss, 1973) than do canonical regression weights (but the weights will be shown for the sake of completeness). The common interpretation of canonical correlation squared as criterion variance accounted for is a misleading overestimation of the strength of the relationship between predictor and criterion sets of variables. A more desirable and appropriate statistic, the redundancy index, was used instead (Gleason, 1976; Stewart & Love, 1968).

A second canonical correlation analysis was made in which the two indices of the extent of part time work in the organization were added as predictors to the set of demographic measures. The improvement in the prediction of job attitudes was assessed, and the amount of attitudinal variance the part time indices uniquely accounted for beyond that already accounted for by the demographic variables was determined.

It should be noted that although more than two functions often are statistically significant in canonical and discriminant analyses, problems of psychological interpretation and stability severely limit their usefulness. Only the first two major discriminant functions in each discriminant analysis and the first two pairs of canonical functions thus were considered and will be discussed.

RESULTS

The correlations among the job satisfaction variables are presented in Table 2.

TABLE 2
Intercorrelations of Attitudinal Measures
(*N* = 9152)

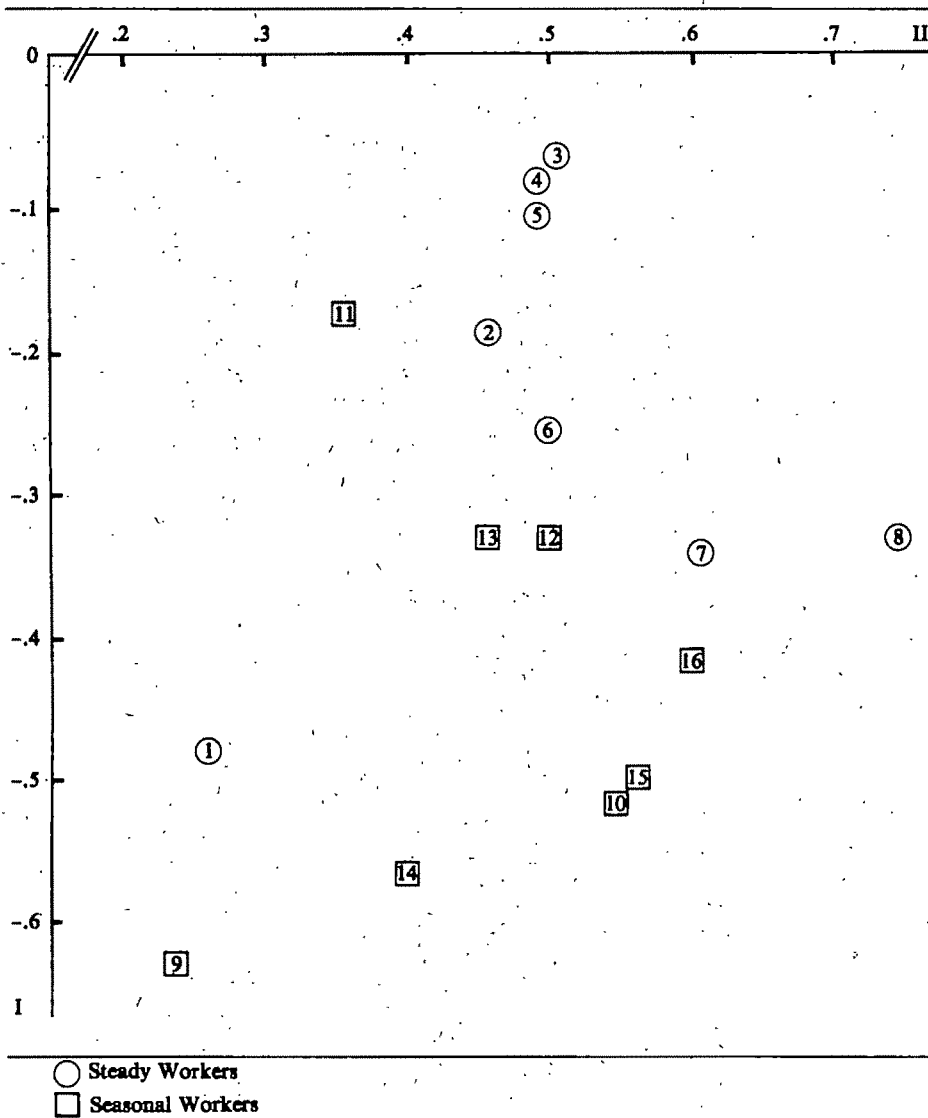
Measure	1	2	3	4	5	6	7	8
1. Supervision satisfaction	—							
2. Company identification	.34*	—						
3. Work satisfaction	.45*	.47*	—					
4. Workload satisfaction	.23*	.17*	.17*	—				
5. Co-worker satisfaction	.50*	.32*	.44*	.21*	—			
6. Physical work conditions	.29*	.27*	.31*	.25*	.25*	—		
7. Pay satisfaction	.29*	.43*	.36*	.20*	.27*	.24*	—	
8. Job security	.24*	.21*	.23*	.09	.23*	.12	.20*	—

**p* < .05

Demographic Discriminant Analysis

Five discriminant functions were statistically significant ($p < .01$) in the discriminant analysis of demographic characteristics. The discriminant power was .13; that is, 13 percent of the variability in demographic

FIGURE 1
Groups of Part-time Workers in
Two-dimensional Demographic Discriminant Space



characteristics was explainable on the basis of part time group membership. The positions of groups in the discriminant space defined by the first two major discriminant functions are displayed in Figure 1. The groups of part time workers are identified in Figure 1.

Of the total discriminatory information in the discriminant solution, 71 percent was contained in the first discriminant function. This function contrasted part time workers primarily on the basis of their seasonal or steady employment. Steady part time employees scored higher on this function than did seasonally employed part time workers. Moreover, for the steady part time workers, the number of hours employed weekly was curvilinearly related to this function. That is, medium hour steady employees had higher scores on this function than did short or long hour steady employees.

An examination of the structure matrix in Table 3 indicates that separation of groups by the first discriminant function was due primarily to race. Opposite ends of the first dimension were defined by white (positive) and black (negative) racial composition of the groups of part time workers. Blacks constituted a higher proportion of employees in seasonal and intermittent part time jobs than in steady, continuous part time jobs. Overall, the racial composition of all steady part time employees in the organization was 71 percent white, 20 percent black, and 4 percent Hispanic, and there was heavier minority representation among seasonal part time employees: 38 percent white, 46 percent black, and 11 percent Hispanic. For the steady and continuously employed part time workers, there also was a pattern of whites representing a greater percentage of workers in the medium hour jobs than in the short or long hour jobs.

TABLE 3
Structure Coefficients and Standardized Discriminant Weights from the Demographic Discriminant Analysis

<i>Dependent Variables</i>	<i>Structure Coefficients</i>		<i>Standardized Discriminant Weights</i>	
	<i>I</i>	<i>II</i>	<i>I</i>	<i>II</i>
Sex ^a	.22	-.22	8.18	-6.79
Race ^b (white)	.80	.47	1.30	-6.05
Race ^b (black)	-.69	-.56	-20.67	-25.50
Race ^b (Hispanic)	-.34	.09	-12.30	-4.93
Education	.25	.16	6.20	5.04
Student status ^c	-.31	.25	-20.28	25.35
Age	.25	-.34	11.56	-18.52
Marital status ^d	-.16	.24	-5.59	9.75

^aSex is scored as 1 for males and as 2 for females.

^bRace is dummy-coded with Asians functioning as the reference group.

^cStudent status is scored as 1 for students and 2 for nonstudents.

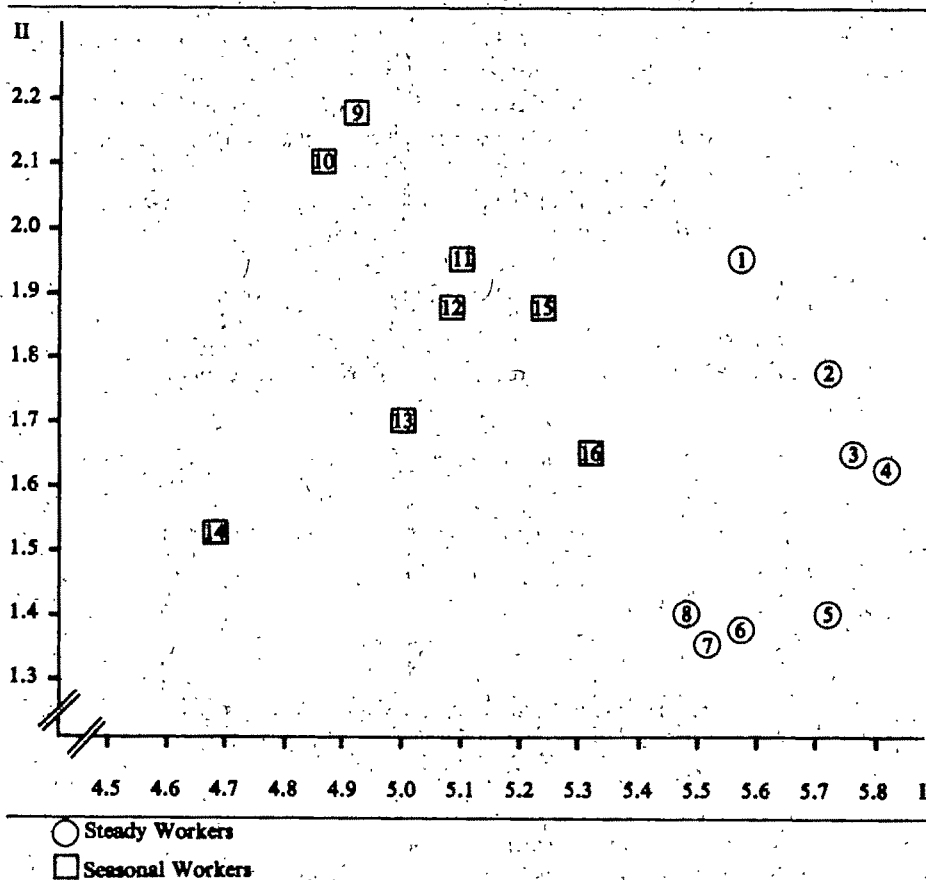
^dMarital status is scored as 1 for married and as 2 for single.

Of the total discriminable variance, 17 percent was explained by the second discriminant function. Long hour employees were separated from

short hour employees by the second function; medium hour employees occupied an intermediate position on this function. Again, as can be seen in Table 3, the demographic variable most responsible for between-group differences on the second function was racial group composition. White (positive) or black (negative) racial composition of the group defined another bipolar racial continuum. For both seasonal and steady employees, blacks represented a higher proportion of workers in short hour, part time jobs than in long hour, part time jobs.

A simultaneous consideration of both discriminant functions reveals that employees in steady short hour and in seasonal short and long hour jobs were predominantly black. On the other hand, part time workers in steady medium and long hour jobs and in seasonal medium hour jobs were largely white.

FIGURE 2
Groups of Part-time Workers in
Two-dimensional Attitudinal Discriminant Space



Attitudinal Discriminant Analysis

Four significant discriminant functions ($p < .01$) were found in the discriminant analysis of job attitudes. The estimated population omega-squared, .07, indicated that between-group differences accounted for 7 percent of the total variance in job satisfaction. The locations of groups in discriminant space defined by the first two discriminant axes are presented in Figure 2. (The 16 groups of part time employees are identified in Table 1.)

The first discriminant function accounted for 62 percent of discriminating information. It separated seasonal from steady part time workers; steady workers scored higher on this function. Steady part time workers were also ordered by the first function in terms of the duration of the workweek. The number of hours worked per week was nonlinearly related to the first discriminant function for steady part time workers. Steady workers who were on medium workweek schedules scored higher on the first function than did those employed on short or long workweek schedules.

As shown in Table 4, co-worker satisfaction and job security defined the first dimension. Seasonal part time employees were less satisfied with their co-workers and felt less secure about their career future in the organization than did steady part time employees. Moreover, steady part time employees who worked fewer than 6 or more than 25 hours each week reported greater co-worker dissatisfaction and greater job insecurity than did steady employees working medium workweek schedules.

TABLE 4
Structure Coefficients and Standardized Discriminant Weights from the Attitudinal Discriminant Analysis

Dependent Variables	Structure Coefficients		Standardized Discriminant Weights	
	I	II	I	II
Supervision satisfaction	.19	-.09	-23.30	-12.84
Company identification	.31	-.31	11.95	-27.45
Work satisfaction	.26	-.47	-4.82	-70.43
Workload satisfaction	.35	.59	26.24	65.90
Co-worker satisfaction	.44	.15	30.96	42.87
Physical work conditions	.15	.32	-4.10	44.71
Pay satisfaction	.23	-.12	-3.44	-3.49
Job security	.91	-.23	84.60	-20.56

The second discriminant function accounted for 23 percent of the discriminable variance. For seasonal and steady employees alike, groups were differentiated by the length of their workweek by this function. More precisely, the second discriminant function was monotonically related to the amount of work time (per week). Seasonal and steady workers had higher scores on this function, the more hours they worked each week.

Work satisfaction (negative) and workload satisfaction determined the meaning of the second discriminant function (see Table 4). As the number of work hours per week declined, part time workers, whether employed seasonally or regularly, became more satisfied with the amount of work but less satisfied with the nature of their job duties.

Factor Analysis of Job Attitudes

The factor analysis of the job satisfaction scales in each group of workers who were steady and continuously employed found that company identification and pay satisfaction loaded highest on the first factor. This factor's coefficient of congruence, averaged across the eight groups of steady part time employees, was .91 with a range from .87 to .94. The second factor in the factor structures of steady employees was defined by satisfaction with supervision, work, and co-workers. The mean coefficient of congruence of the second factor was .94 with a range from .90 to .96. The factor structures of different groups of steady part time workers thus were very similar.

Slightly less similar factor structures were exhibited among groups of the seasonally employed. The first factor was identified by its high loadings with company identification and satisfaction with pay and work. This factor's mean congruence coefficient was .86 with a range from .78 to .91. The second factor was defined by supervision and co-worker satisfaction. Its average congruence coefficient was .73 with a range from .38 to .83. The smaller sample sizes may explain, in part, the lower consistency of factors across the eight groups of seasonal part time employees.

Despite the apparent dissimilarity of factor structures between steady and seasonally employed part time employees, the averaged congruence coefficient computed between like factors from the two subsamples was .82. The overall mean coefficient of congruence for the entire sample was .85. The factor structures of the measures of job satisfaction, therefore, displayed relatively high consistency among the diverse groups of part time workers.

Canonical Correlation Analysis

The canonical correlation procedure with demographic characteristics as predictors and job attitudes as criteria revealed six significant canonical correlations ($p < .01$). An examination of the structure matrix presented in Table 5 indicates that work satisfaction exclusively defined the first canonical criterion variate. Also, the first canonical predictor variate was defined by student status, age, and marital status. That is, high scores on the first demographic linear composite were earned by nonstudent, married, or older part time employees. Hence, the nonstudent, older, or married part time worker showed greater satisfaction with the nature of his work than did the student, younger, or single worker. Although the

first canonical correlation was .45, the noncumulative redundancy index was .03. In other words, 3 percent of the variation in job satisfaction was accounted for by the first predictor variate.

TABLE 5
Structure and Canonical Weight Matrices
from the Canonical Correlation Analysis

Criterion Variables	Structure Matrix				Canonical	
	Criterion Variates		Predictor Variates		Criterion Weights	
	I	II	I	II	I	II
Supervisor satisfaction	.26	.03	.12	.01	-.11	-.26
Company identification	.36	.25	.16	.07	-.04	.17
Work satisfaction	.96	.10	.43	.03	1.13	-.14
Workload satisfaction	.02	-.03	.01	-.01	-.08	-.05
Co-worker satisfaction	.29	.34	.13	.09	-.06	.35
Physical work conditions	.13	-.21	.06	-.06	-.13	-.35
Pay satisfaction	.27	.22	.12	.06	.00	.11
Job security	.06	.87	.03	.23	-.13	.88

Predictor Variables	Structure Matrix				Canonical	
	Criterion Variates		Predictor Variates		Predictor Weights	
	I	II	I	II	I	II
Sex ^a	.20	.04	.46	.16	.23	.18
Race ^b (white)	.05	.23	.11	.86	-.06	.55
Race ^b (black)	-.03	-.20	-.08	-.77	-.02	-.24
Race ^b (Hispanic)	-.03	-.08	-.06	-.30	-.02	-.07
Education	-.20	.11	-.45	.42	-.23	.37
Student status ^c	.31	-.06	.70	-.24	.16	-.36
Age	.40	.05	.89	.17	.64	.14
Marital status ^d	-.31	-.05	-.70	-.17	-.15	-.19

^aSex is scored as 1 for males and as 2 for females.

^bRace is dummy-coded with Asians functioning as the reference group.

^cStudent status is scored as 1 for students and as 2 for non-students.

^dMarital status is scored as 1 for married and as 2 for single.

Table 5 indicates that job security determined the meaning of the second canonical criterion variate. The accompanying second canonical predictor variate was defined by racial characteristic. White workers had higher scores on this linear combination than did black workers. In other words, black part time employees expressed lower job security than did white part time employees. The second canonical correlation was .27, but 1 percent of the criterion variance was explained by the second predictor variate.

The cumulative redundancy coefficient (calculated from all canonical functions) for the entire canonical correlation analysis was .047; 4.7 percent of the total variance in the set of satisfaction measures was extracted by the set of demographic predictor variates. When the part time work indices (i.e., length of workweek and seasonality of employment) were included in the predictor battery, the cumulative redundancy coefficient in the second canonical correlation analysis increased slightly to .05. Canonical correlations in the second analysis also improved imperceptibly. The peripherality of the part time position in the organization thus

made little contribution to the prediction of job attitudes beyond that already established by demographic characteristics.

DISCUSSION

The demographic characteristics of part time employees were related to the nature and extent of their participation in the work force (and in the organization). In this study, the major demographic factor associated with occupancy in various kinds of part time positions in a retail sales organization was racial characteristic. In specific, the steady short hour jobs and the seasonal short and long hour jobs comprised mainly blacks. The steady medium and long hour jobs and seasonal medium hour jobs were filled mostly by whites. In summary, part time employees in jobs that were marked by marginality and pronounced peripherality (i.e., characterized by seasonality and short workweek schedules) were predominantly non-white racial minorities, particularly blacks.

Although the pattern of job satisfaction (more precisely, the factor structure of attitudinal measures) was not related to the type of part time employment, the level of job satisfaction was. Part time workers who were steadily and continuously employed in the organization were more satisfied with their co-workers and expressed greater job security than did those who were seasonally and intermittently employed. In addition, regularly employed part time workers reported higher satisfaction with their co-workers and felt more secure about their jobs if they worked a medium workweek schedule than if they worked short or long workweek schedules. Furthermore, work satisfaction improved and workload satisfaction worsened the more hours part time employees spent each week on their jobs. Generally, part time workers whose work status in the organization was highly peripheral and whose attachment to the labor force was weak showed the poorest job attitudes. In short, job peripherality was inversely related to job satisfaction.

However, the peripherality of part time work did not influence the level of job satisfaction independently of the effects of demographic characteristics. The differences in job satisfaction observed among the different groups of part time workers may be attributed to their dissimilar demographic profiles because the type of worker is confounded with the type of employment status. Controlling for the covariation between demographic variables and job attitudes virtually eliminated the impact of the peripherality of the part time job on job attitudes. That is, little variance in the satisfaction measures was uniquely associated with the two indices of peripheral work status in the organization.

The relationships among peripherality of the job, job attitudes, and demographic variables found in this investigation may have implications for future comparisons between part time and full year, full time employees, particularly in the retail sales industry. Because year-round employees on full workweek schedules are strongly attached and firmly

committed to the labor force, they may be expected to express higher job satisfaction than will part time employees, although their patterns of job satisfaction would be alike. Moreover, the difference in job attitudes that appears may be attributable largely to the different demographic backgrounds of part time and full year, full time workers. The nonperipheral work force would have lower representations of nonwhite minorities than would the part time work force.

Although one segment of the peripheral work population was not included in this study, namely, the intermittent, full time workers, the results of the present study may have implications for them also. That is, they may be expected to show poorer job attitudes than would full year, full time employees, but their patterns of relationships among job attitudes would be similar. In addition, with a heavier concentration of racial minorities among their ranks, part year, full time workers may have demographic profiles dissimilar to those of nonperipheral workers.

The two discriminant solutions in the present study suggest that the length of the workweek for part time workers may not be as critical for job peripherality as are the intermittency and seasonality of work. Specifically, the primary discriminant functions in both the demographic and attitudinal discriminant analyses mainly separated groups of part time workers by seasonality of employment. Seasonality of work created greater between-group variation than did hours of work per week.

If it is generally true that employment discontinuity and intermittency (as measured by the number of weeks worked per year) is a more important determinant of peripherality than is the length of the workweek (or whether one works part time or full time), then full time workers employed on intermittent and seasonal work schedules may show worse job attitudes and have higher concentrations of racial minorities than will part time workers who are continuously employed for the entire year. Further, the part year, part time workers may be the most peripheral and, consequently, they may show the worst job satisfaction and have the heaviest nonwhite minority representation in the entire work force. Again, it should be emphasized that the peripherality of the work experience is not expected to be related to the pattern of job attitudes (as it was not for the part time employees in this study). (It should be noted that all of the generalizations above are limited to the retail sales industry of which this investigation was made.)

In addition to attitudinal differences, some researchers have suggested that the behavioral and motivational characteristics of peripheral workers are different from those of regular workers. For example, Gannon (1975) argued that peripheral employees lack a career orientation and have lower job involvement and psychological commitment to the organization than do regular employees and they thus pose different, if not more difficult, personnel problems for management. On the other hand, Werther (1975) proposed that part time employees (if they are recruited from retired workers and housewives) are as reliable, responsible, and productive as are

full time employees. Discussions of such differences between peripheral and regular workers are mainly speculative and contradictory. Empirical research on the behavioral and motivational differences is required. Finally, more specific subtypes of peripheral employees need psychological examination, such as the temporary help workers (Gannon & Brainin, 1971), involuntary peripheral workers, and multiple job holders who are firmly attached to the labor force but may behave like peripheral workers on their secondary jobs.

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Utilizing Feedback and Goal Setting to Increase Performance Appraisal Interviewer Skills of Managers¹

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A field experiment was conducted to compare the effectiveness of two approaches to improving the way managers handle performance appraisal interviews with their subordinates. The results showed that the feedback plus goal setting condition was superior to the feedback-only condition and to the control group on several interview effectiveness criteria.

Performance appraisal systems have a number of important uses and objectives. A performance appraisal system provides information that can be used by managers for deciding merit raises, promotions, transfers, and dismissals. Performance appraisal systems also can help managers to observe their subordinates more effectively, to do a better job of coaching and developing subordinates, and to motivate subordinates. In practice, however, performance appraisal programs often have yielded unsuccessful and disappointing results (McGregor, 1957; Oberg, 1972; Pym, 1973; Thompson & Dalton, 1970).

One integral part of any performance appraisal system is the performance appraisal interview. The interview process is an essential mechanism for subordinate development as well as one of the main components of management-by-objectives systems (Carroll & Tosi, 1973). Despite the importance of the appraisal interview, very little attention has been given to investigating ways of increasing a manager's repertoire of effective interviewer skills. Maier (1958) has argued that one of the major

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reasons why performance interviews have failed to produce positive improvements in subordinate job performance has been the lack of managerial skill in conducting the interview itself. There is an obvious increasing need to develop methods for training managers how to conduct successful performance interviews.

Providing individuals with informative feedback has been shown to influence employee learning (Hillery & Wexley, 1974), satisfaction (Hackman & Lawler, 1971), motivation (Ammons, 1956), and performance (Bingham, 1932; Nadler, Mirvis, & Cammann, 1976). Although some researchers (Cummings, 1976; Greller & Herold, 1975; Herold & Greller, 1977; McCall, 1975) have started working on defining feedback and exploring the potential sources of feedback, relatively little empirical research has been conducted regarding the issue of feedback in the work setting. As McCall (1975) points out, it would be useful to determine the effects of such factors as the source of feedback (self, subordinate, superior, external individual other than the boss, the task itself), the medium of transmission (face-to-face oral, written, telephone, meetings), the content (quantity, quality, complaints, praise), and the frequency of feedback (only once, daily, weekly, monthly, yearly).

Another promising approach for changing managerial behavior is the use of feedback in combination with goal setting. In the last several years, a considerable number of field studies have established the practical utility of goal setting as a method for modifying behavior and increasing performance (Latham & Yukl, 1975a; Ivancevich, 1976, 1977; Latham & Baldes, 1975; Latham & Kinne, 1974; Latham, Mitchell, & Dossett, 1978; Latham & Yukl, 1975b; Ronan, Latham, & Kinne, 1973; Wexley & Nemeroff, 1975). One of the key unresolved issues related to goal setting is the role of feedback. It is unclear whether feedback is necessary for the effectiveness of a goal setting program (Latham & Yukl, 1975a). It also is unclear whether the effects of feedback on motivation can be attributed entirely to a person's internal goal setting process, as proposed by Locke and his colleagues (Locke, 1968; Locke & Bryan, 1969; Locke, Cartledge, & Koepel, 1968). In a field experiment, Kim & Hamner (1976) found that when evaluative and nonevaluative feedback were added to goal setting, greater improvement in performance occurred. In a laboratory study, Erez (1977) found evidence that feedback is a necessary condition for self set goals to be effective. Feedback in these two studies was in terms of performance measures. Only one previous study has given feedback in terms of specific behaviors (Latham et al., 1978). Latham et al. had supervisors evaluate subordinates (engineers/scientists) on eight behavioral criteria and feed back this information to the subordinates. The results of the study showed that feedback affected performance only when used to set specific goals. These three studies suggest that a combination of feedback and goal setting is the best approach for changing behavior and performance.

The purpose of the present study was to investigate the effects of behavioral feedback and goal setting in a different context, namely, as a

method for improving the performance appraisal skills of managers. Specifically, the purpose was to determine if improvements would occur when managers were provided feedback about subordinate perceptions of their (managers') behavior in the appraisal interview. A second intent was to determine the importance of having an explicit goal setting component in the training intervention. Therefore, a field experiment was conducted in which three conditions were compared: (1) feedback, (2) feedback plus explicit goal setting, and (3) control group.

METHOD

Subjects

Four major departments were chosen from an insurance company located in the northeastern portion of the United States. The departments selected were individual life insurance sales, the controller department, actuarial department, and group life insurance sales. From these four departments, 30 managers were randomly selected to serve as subjects in the study. The managers' (8 male and 22 female) ages ranged from 25 to 60, with a median age of 42.5. The average manager had some college education and his/her length of time at the company ranged from 1 to 29 years, with a median tenure of 14.5 years. The length of time at his/her present position ranged from 6 months to 11 years, the median being 4.5 years. In addition, 135 subordinates of these managers were randomly selected to fill out questionnaires. The subordinates' ages ranged from 19 to 62, with a median age of 39.5. The average subordinate had a high school education, had been with the company for an average of 7.5 years, and had worked at his/her present job for approximately 12.5 years.

Experimental Design

The study was an experiment in which two training conditions (feedback, feedback plus goal setting) were compared to each other and to a control group that received no intervention except administration of premeasures and postmeasures. Ten managers were randomly assigned to each condition. An approximately equal number of managers in each of the four functional departments was in each condition, in order to balance any effects due to differences among departments. From three to seven subordinates were randomly selected to fill out questionnaires. There were 49 subordinates in the feedback plus goal setting condition, 45 subordinates in the feedback condition, and 41 subordinates in the control condition. Preliminary analysis showed that the subordinates in the three conditions did not differ on age, education, sex, and length of time in present position.

Procedure

The feedback in this study was in terms of subordinates' perception of their managers' behavior during the most recent performance appraisal interview (usually held within the prior three months). Subordinate perceptions were assessed by means of a 43-item questionnaire. These 43 items evolved from two main sources. First, an extensive review of existing performance appraisal literature was made. Second, a pilot project was conducted in a variety of organizational settings in which managers and subordinates were asked to recount critical incidents (Flanagan, 1954) that they, through personal experience over the years, had found to be highly effective or highly ineffective characteristics of their performance appraisal interviews. Two examples of these items are as follows: (1) my manager mentions specific occasions when I have performed well; (2) when my manager and I disagree about my job responsibility, my manager tries to clarify the disagreement.

Two research associates from the Life Office Management Association served as "trainers" and administered the feedback and feedback plus goal setting treatments. Prior to the study, the research associates were instructed in the use of appropriate procedures for giving feedback and setting goals. They were not told the objectives of the study nor the specific hypotheses being tested. Each research associate was randomly assigned half the managers in the feedback condition and half the managers in the feedback plus goal setting condition.

In the feedback condition, one-hour interviews were held with each manager, and specific feedback on subordinate's perceptions of 43 interview behaviors was reviewed and discussed. Feedback was given at one point in time by an external source other than the manager's boss (trainer), in a face-to-face oral transmission session. In terms of content, the feedback given was in the form of means and standard deviations from the questionnaire responses of the manager's subordinates. Norms were also provided in the form of scale and item means and standard deviations for the total sample of managers in the company. The feedback, together with the norms, permitted managers to determine their own strengths and weaknesses on specific interview behaviors and to determine areas in which improvements might be needed. The meaning of the feedback data and sample norms was carefully explained to each manager by the trainers. Moreover, during the feedback sessions, great care was taken to insure a minimum of threat to the managers. They were asked to view the feedback as diagnostic rather than evaluative. The trainers pointed out that the feedback information would have developmental implications only to the extent that the managers used it to increase their repertoire of effective appraisal interview skills.

After the trainer explained the feedback session, he gave each manager a checklist of 43 interview behaviors corresponding to the behaviors on the feedback questionnaire that had been administered to subordinates. The

purpose of this checklist was to provide managers in the feedback condition with examples of specific behaviors in order to help guide their efforts to improve their interview effectiveness. Some examples of the 43 checklist items are as follows: (1) I will ask my subordinate to work with me in developing very specific performance goals for the coming period; (2) I will give my subordinate a clear understanding of the results I expect him/her to achieve; (3) During the performance appraisal interview, I will make sure that my subordinate and I agree on the major responsibilities of his/her job; (4) At the beginning of the performance appraisal interview, I will clearly and concisely state the purpose of the session; (5) During the performance appraisal interview, I will be very supportive, stressing good points before discussing needed improvements; (6) I will help my subordinate establish priorities for the coming period; and (7) I will ask my subordinate to discuss his/her personal goals in order to help with his/her career development.

In the feedback plus goal setting condition, the feedback procedure was essentially the same. However, after the feedback was explained, reviewed, and discussed, the trainers encouraged each manager to set specific goals to increase the use of effective behavior during the manager's next round of appraisal interviews. After the trainer gave a manager the 43-item checklist, the trainer asked the manager to choose the 12 behaviors on which improvement was most needed. It was felt that this was a realistic number of behaviors for the managers to work on before their next round of performance appraisal interviews. The choice of the twelve behaviors was left up to each manager, and at no time did the trainers select which items would be used as behavioral goals. Once he/she chose his/her twelve behavioral items, the manager practiced the same set of behaviors for each subordinate interviewed. After each performance appraisal interview, the manager used a checklist to record his/her use of any of the twelve behaviors. The checklist provided additional (internal) feedback regarding goal attainment.

In the control group, managers did not receive any feedback or goal setting intervention between the premeasures and postmeasures. The managers in this group were merely informed that an audit of the organization's performance appraisal interview system was being conducted and that, from time to time, some of their subordinates may be asked to fill out questionnaires as to how they perceive the appraisal process.

In order to try to minimize the possibility that managers in the three conditions would talk to each other about their treatments, managers were asked not to discuss the study with each other. In talking with the managers at the time postmeasures were taken, the researchers concluded that there was indeed a minimum of discussion among managers during the study.

Criterion Measures

Three measures of appraisal interview effectiveness were obtained from rating scales administered to subordinates. The scales were administered twice. Premeasures of the interview behaviors and the criterion variables were obtained together five to six weeks before the training intervention. Postmeasures on the same variables were obtained after the managers had their next appraisal interviews with subordinates, which was approximately three to four weeks after the training intervention. Each rating scale consisted of items with five response choices ranging from (1) describes it very poorly to (5) describes it very well. Two statements were utilized to measure the extent to which subordinates perceived that their manager conducted a successful interview: (1) My manager conducts a successful performance appraisal interview; (2) My manager conducts a very effective performance appraisal interview. This scale had an alpha coefficient of .92. Motivation to improve was measured by the following two statements: (1) At the end of the interview, I am motivated to improve my performance; (2) My performance appraisal interview motivates me to work hard (alpha coefficient .89). The extent to which subordinates were satisfied with the appraisal interview itself was measured by four assertions: (1) I found the interview to be a satisfying experience; (2) Relations with my manager are better because of the interview; (3) The interview helps me learn to do a better job; (4) I feel at ease during the performance appraisal interview (alpha coefficient .86).

The final criterion of appraisal interview effectiveness was the absenteeism of subordinates, the data for which were collected for three months before and after the completion of their manager's training. Absenteeism was defined as the number of scheduled working days a subordinate spent away from the job for reasons other than injury, major illness, vacation, or a prearranged leave of absence. The absenteeism measure was found to be fairly stable over time when there was no feedback or goal setting treatment. The three month pre- and postmeasure test-retest reliability coefficient was found to be .57 ($p < .01$) for the control group.

RESULTS

Results for Criteria Variables

The first step was to conduct one-way analyses of variance on the premeasures to insure that no significant differences existed among the three treatment groups prior to training. The results showed no significant differences among the three groups for any of the interview criteria. Consequently, the effects of the experimental treatments on the interview criteria were evaluated with an analysis of variance for the postmeasure data, as recommended by Cronbach and Furby (1970). Table 1 presents

the means, standard deviations, and *F* values for the three groups on each of the postmeasures of appraisal interview effectiveness. The *F* tests for interview success, motivation to improve, satisfaction with the interview, and absenteeism all were statistically significant. Because the absenteeism data were slightly skewed, a logarithmic transformation was used to normalize the distribution. The results and conclusions remained the same.

TABLE 1
Means, Standard Deviations, and *F* Values
for the Post-Criteria of Appraisal
Interview Effectiveness

Performance Appraisal Interview Criteria	<i>M and SD^a</i>			<i>F</i>
	Feedback + Goal Setting	Feedback	Control	
Interview success	8.33 (1.43)	7.36 (1.82)	6.98 (2.33)	6.36**
Motivation to improve	7.92 (1.81)	7.13 (1.96)	6.44 (2.67)	5.32**
Satisfaction with interview	15.12 (3.25)	13.98 (3.32)	13.07 (3.65)	4.12*
Absenteeism	0.79 (1.14)	0.91 (1.70)	1.70 (2.24)	3.51*

^aNumbers in parentheses are standard deviations.

**p* < .05

***p* < .01

A Duncan's Multiple Range Test was used to make post hoc comparisons of each pair of conditions. The results are summarized in Table 2. Managers in the feedback plus goal setting condition had significantly higher subordinate ratings of interview success than did managers in the control group. They also had higher ratings than managers in the feedback condition. There was no significant difference between the feedback condition and the control group. On motivation to improve, a Duncan's test indicated only one significant difference. Subordinates in the feedback plus goals condition had greater motivation to improve than did subordinates in the control group. Similar results were found for subordinate satisfaction with the interview. Subordinates in the feedback plus goals condition were more satisfied than were subordinates in the control group, but no other differences were significant. Absenteeism for each training condition was significantly lower than in the control group, but the two training groups did not differ significantly from each other on absenteeism. It should be noted that even when the data were analyzed using analysis of covariance or residual gain scores, the results remained essentially the same. All of the main effects were significant for each one of the interview effectiveness criteria. The only difference in results was found in conducting post hoc comparisons for the residual gain scores. A Duncan's test revealed no significant difference between the feedback and control

TABLE 2
Summary of Duncan's Multiple Range Tests
for the Performance Appraisal Interview Criteria

<i>Performance Appraisal Interview Criteria</i>	<i>Feedback + Goals vs. Feedback</i>	<i>Feedback + Goals vs. Control</i>	<i>Feedback vs. Control</i>
Interview success	.05	.01	ns
Motivation to improve	ns	.01	ns
Satisfaction with interview	ns	.01	ns
Absenteeism	ns	.01	.05

group on absenteeism ($p > .05$). All of the other post hoc comparisons revealed results similar to the post-only analyses described in Table 2.

In addition to making post hoc comparisons of each pair of conditions, comparisons from pre- to postmeasures within each condition were conducted. Table 3 shows the correlated t values obtained by comparing the pre- and postinterview effectiveness criteria for each of the experimental conditions. The t -tests for the feedback plus goal setting condition showed significant improvement on subordinate ratings of interview success, motivation to improve, and satisfaction with the interview. Moreover, absenteeism was found to be significantly lower from the pre- to the post-training measure for the feedback plus goals condition. Neither the feedback nor the control condition was found to have any significant improvement on any of the interview effectiveness criteria.

TABLE 3
Correlated t -Values for Comparisons
on Pre- and Post-Criteria of
Appraisal Interview Effectiveness

<i>Performance Appraisal Interview Criteria</i>	<i>Feedback + Goal Setting</i>	<i>Feedback</i>	<i>Control</i>
Interview success	4.51**	1.26	0.08
Motivation to improve	3.17**	1.50	-0.84
Satisfaction with interview	2.39*	1.40	-0.93
Absenteeism	-4.62**	-1.66	0.43

* $p < .05$

** $p < .01$

Supplementary Analysis of Goal Setting Process

Data on measures of the 43 interview behaviors were analyzed in order to verify the effects of the goal setting manipulation in managerial behavior in the performance appraisal interview. These behaviors were perceived to be fairly stable in the control group as measured by a test-retest correlation ($r = .68$, $p < .01$) over an 8 to 10 week period. Correlated t -tests were employed to determine whether the subordinates in the feedback plus goal setting condition perceived their managers to increase the

12 behaviors for which improvement goals were set. The results indicated that there was a statistically significant overall difference [$t(9) = 4.10$, $p < .01$] between the premeasures ($\bar{x} = 3.04$) and the postmeasures ($\bar{x} = 3.36$) for each manager's combined score on his 12 goal behaviors. These results indicated that a manager's subordinates in the feedback plus goals group perceived that their manager practiced his goal behaviors to a greater extent after training. For the remaining 31 behaviors on each manager's checklist, there was no significant difference [$t(9) = 0.59$, $p > .05$] between the combined premeasure score ($\bar{x} = 3.51$) and the combined postmeasure score ($\bar{x} = 3.68$). In other words, managers did not increase their use of particular behaviors unless goals were set for them.

An analysis also was made to determine whether the managers in the feedback plus goals condition set goals for behaviors on which they were relatively weak and in need of improvement. The results showed that, given the opportunity, managers in the feedback plus goals group chose goals that needed to be improved, as indicated by the lower average premeasure score ($\bar{x} = 3.04$) on their 12 goal items compared to the remaining 31 ($\bar{x} = 3.51$) nongoal items ($t(9) = 3.93$, $p < .01$). In summary, the results show that the goal setting manipulation had the intended effect on goal selection as well as on subsequent behavior of managers.

DISCUSSION

The results of the present study showed that the feedback plus goal setting condition was superior to the control group on subordinates' perception of interview success, on their motivation to improve, on their satisfaction with the interview, and on subordinate absenteeism rate. The feedback condition was superior to the control group only with respect to absenteeism. The feedback group was significantly lower than the feedback plus goal setting group with respect to interview success. The data analyses taken together indicate that feedback plus goal setting was clearly superior to feedback alone as a training intervention. The effects of feedback were weak and inconsistent when not accompanied by explicit goals. The results are consistent with findings in earlier studies by Kim and Hamner (1976), Erez (1977), and Latham et al. (1978).

The results of this study provide further support for Locke's (1968) theory of goal setting in general and Locke et al.'s (1968) findings in particular by showing that the mere presence of feedback (knowledge of results) does not, by itself, necessarily increase an individual's performance level, even when this feedback is very specific and combined with a checklist mechanism. It should be noted that there was no limitation on goal setting or self recording of behaviors practiced by managers in the feedback condition. These managers could use the feedback they received to set their own goals, and they could use the checklist to measure improvement. Post experimental interviews with some of the managers in this condition indicated that they tried to practice some of the checklist

behaviors. However, the managers said that it was difficult to decide how many behaviors to emphasize, and without immediate explicit goals, they tended to forget feedback information about which behaviors were most in need of improvement. In other words, when not asked to set explicit improvement goals immediately, managers receiving feedback usually did not set specific goals on their own, although some did have a general goal to do better. Perhaps feedback could have led to more setting of specific goals if a written record of the feedback information had been given to the managers after the feedback session.

The present study is the first to demonstrate that feedback and goal setting can be used to improve the performance appraisal skills of managers. Further studies should be conducted, however, with different groups of individuals in order to determine whether the current results generalize to other samples and organizational settings. Moreover, it is likely that even greater improvement would occur if the training intervention incorporated additional training techniques such as behavior modeling and role playing to increase manager's skills. Simply showing managers' checklist descriptions of behaviors is not likely to be as effective as actually modeling the behaviors in films and having managers practice them in a training workshop. Further research now is in progress to develop and test a more comprehensive performance appraisal training program.

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The Effects of Positively and Negatively Contingent Rewards and Individual Differences on Performance, Satisfaction, and Expectations¹

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A laboratory experiment employing a random bonus found satisfaction to be a function of reward magnitude, not performance contingency. Individual differences contributed to both performance and satisfaction. Expectations were influenced by reward receipt, not performance. However, self-evaluations of performance were not related to reward receipt.

A series of papers by Cherrington and his co-workers (Cherrington, Reitz, & Scott, 1971; Cherrington, 1973; and Scott & Cherrington, 1974) examined the effects of positively and negatively contingent rewards on performance, satisfaction, and expectations in differing conditions of reward feedback and interpersonal competitiveness. They found that subjects who were rewarded, regardless of the direction of the contingency, were more satisfied but did not perform better than nonrewarded subjects. But subjects receiving positively contingent rewards improved performance relatively more than did those receiving negatively contingent outcomes. Immediate knowledge of rewards was positively related to subsequent performance, suggesting that prompt communication had reinforcement value. Knowledge of past reward treatment was positively related to future expectations, irrespective of present performance. Subjects who competed with others for rewards performed at a higher level than did those under conditions in which rewards were based on absolute

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individual performance or group performance levels. Finally, there was evidence to support the idea that satisfaction with rewards affects feelings in areas unrelated to the experimental condition being manipulated.

A variety of studies support these reward-performance-satisfaction findings. Among managers, Greene (1973) found that both performance and merit pay caused satisfaction, but satisfaction did not cause subsequent performance, suggesting that the reward rather than performance caused satisfaction. Orpen (1974) found that contingent reward systems were related to improved production quality and positive performance-satisfaction relationships for assembly line workers. Kesselman, Wood, and Hagen (1974) found that satisfaction and performance were significantly related both for individuals whose pay was contingent on performance and for those whose pay was contingent on seniority. It is difficult to determine, however, whether or not outcomes were actually contingent for the seniority group. It is plausible to presume that rated job performance might increase with seniority, thereby making pay also performance contingent. These results generally support the idea that satisfaction is dependent primarily on reward magnitude.

Although Cherrington's (1973) results support the "spread of effect" hypothesis, results from other studies highlight the singular effects of the manipulated condition on satisfaction. For example, in an earlier study concerned primarily with testing hypotheses related to instrumentality theory, Graen (1969) found that subjects expressed significantly greater satisfaction only on dimensions related to the type of reward they had received. It would seem reasonable that the reward would have the greatest effect on the satisfaction scale for which it is the most salient outcome.

The studies by Cherrington and his colleagues were well controlled and found significant effects of competition, reward certainty, and reward contingency on performance and satisfaction. But there are some limitations and unanswered issues that need to be addressed. First, the experiments involved repeated measures, but the reported results were given by hour in a cross-sectional manner. The proportions of variance accounted for by between- and within-subjects effects are unknown. Second, individual differences that might be expected to be related to performance or satisfaction are not measured. Third, the rewarding of low performers and the nonrewarding of high performers implicitly establishes conditions of over- and underpay inequity relative to appropriately rewarded subjects. Fourth, the role of past performance, irrespective of reward, is not examined as a predictor of future performance.

The experiment reported here replicates and extends the procedures reported by Cherrington et al. (1971) and Cherrington (1973). Several hypotheses consistent with or additive to the earlier findings follow:

1. *Satisfaction will be positively related to reward magnitude.*
2. *Satisfaction will be unrelated to performance.*

3. *Performance among contingently rewarded subjects will improve more than among noncontingently rewarded subjects.*
4. *Expectations of reward receipt will be more strongly related to reward magnitude than to performance.*
5. *Satisfaction with nonpay aspects will become increasingly associated with reward magnitude over time.*
6. *Consistent with equity theory (Adams, 1965), appropriately rewarded subjects will be more satisfied than inappropriately rewarded subjects.*
7. *Consistent with Tornow's (1971) findings, subjects who view ambiguous job statements such as "dedication," "doing one's best," etc., as job inputs rather than job outcomes will be less satisfied with their pay and the equity of their pay.*

METHOD

Treatments

The random bonus award procedure outlined by Cherrington et al. (1971) was used resulting in positively contingent pay (high performers received a bonus payment, low performers did not) or negatively contingent pay (low performers received a bonus payment while high performers did not). Thus, there are four treatment groups: high performers receiving the bonus, high performers not receiving the bonus, low performers receiving the bonus, and low performers not receiving the bonus.

Subjects

Subjects were recruited through student newspaper advertisements reading "Data coders wanted. No experience necessary. Three hours work. [Phone number.]" As applicants inquired about the job, they were told that the experimenter held a contract from an out-of-state firm to study the relative speed and cost of manual vs. computerized coding of catalog sales and price changes. To make the comparison, a sample of coding speed and accuracy had to be obtained. Subjects would provide these data on a simulated task. The experimenter also explained that "we want to find out if scores on a clerical employment test are related to performance, if financial incentives are related to performance, and if people are satisfied with this type of work." Applicants were told that base pay rates were \$1.70 per hour and that being in the top 50 percent on performance for a given hour would earn them a \$1.00 bonus for that hour. Appointments to take the Minnesota Clerical Test were made for all applicants expressing interest, and applicants who completed the test were hired. Tests were not scored until after the experiment was completed. Applicants were told that these test scores were of interest only in the later

validation against performance. Seventy-six applicants participated in the experiment in groups of 11, 12, 14, 17, 11, and 11.

Only female applicants were hired. Males probably would have had higher past salaries and thus would be less satisfied with equivalent pay outcomes. The task also seemed to indicate that females would perform better. Measures of perceptual speed and accuracy are higher among females (Tyler, 1965).

Task

Each subject received a 30-page computer printout containing 1,500 data sets. Each row of data consisted of an 8-digit alphanumeric part number, a price for that part, another part number, the price for that other part, and the quantity sold. Catalog numbers in column three were randomly sequenced. Those in column one were alphanumerically ordered. Subjects were to record the information from columns 3-5 onto their coding sheets, then flip through their listings to find a part number match from the first column (all were matchable), and record its price. This sequence completed one unit of output.

Measurement

Subjects completed four instruments: the Minnesota Clerical Test (MCT); the Tornow Input-Outcome Checklist (TIOC) (Tornow, 1971); three items evaluating their performance as to quality of output, quantity of output, and overall performance; and one item reflecting their expectations of earning the bonus (all on 7-point scales); and a slightly modified semantic differential satisfaction questionnaire from Cherrington et al. (1971) designed to measure general affective tone (me at this task: appreciated-unappreciated, rewarded-penalized, satisfied-dissatisfied, encouraged-discouraged), general arousal (me at this task: interested-bored, spirited-lifeless, alert-listless), personal competence (me at this task: efficient-inefficient, productive-unproductive, reliable-unreliable, effective-ineffective), general satisfaction with pay (my pay: pleasing-annoying, reasonable-unreasonable, superior-inferior, rewarding-penalizing), equity of pay (my pay in comparison with what others in my group received: fair-unfair, high-low, reasonable-unreasonable; my pay in comparison with the effort I expended: fair-unfair, adequate-inadequate, high-low; my pay in comparison to what others get for similar work on the campus: superior-inferior, high-low, reasonable-unreasonable), attractiveness of fellow workers (my fellow workers: sociable-unsociable, helpful-obstructive, pleasant-unpleasant, unselfish-selfish, cooperative-uncooperative), and attractiveness of task (the task: attractive-repulsive, exciting-dull, good-bad, interesting-boring, superior-inferior, wholesome-unwholesome).

With the exception of the equity of pay measure, all the factors are equivalent to those used by Cherrington et al. (1971). Equity of pay combines concepts measuring pay in relation to external others working on the same task, external others in the same labor market, and against internal effort-reward comparisons.

Procedure

When each group had assembled, working materials were distributed to the subjects, the assistant and experimenter were introduced, and instructions on the session's procedures were read.

Subjects worked for three 45-minute sessions with breaks after each. During the work period, completed work was picked up periodically to allow, supposedly, continuous scoring. Immediately after the 45-minute period subjects rated their perceptions of performance and bonus expectations before going on their breaks. Also, at the end of the first session, before rewards were announced, all subjects completed the TIOC to "provide norming information for females." No restrictions were placed on the use of break time except that subjects could not work during the break. After the break, bonus recipients' names were announced, and subjects immediately completed the satisfaction questionnaire and returned to work.

At no time during the experiment was the completed work actually scored and no feedback was given to any subject, singly or in the group, about her *actual* performance. The only feedback given was the naming of the bonus recipients. Subjects were free to discuss their work with others during breaks, just as in a normal work environment, but the fact that their work was continuously picked up during the work sessions made visual comparisons extremely difficult.

Bonuses were randomly allocated after the first work session break and assigned to the same subjects for the subsequent sessions. After the last satisfaction questionnaire was completed, subjects were debriefed and each was paid \$8.10.

Design and Analysis

The design was a $2 \times 2 \times 3$ factorial with repeated measures on the third factor. There also were two between-subjects covariates: (a) the sum of the names and numbers scores on the MCT and (b) the sum of the items checked as inputs on the TIOC. Both of these measures were taken prior to any reward announcement.

The three degrees of freedom from the between-subjects section of the ANOVA were assigned to a set of orthogonal contrasts to measure the relative contribution of initial performance level, reward receipt, and appropriateness of reward given performance level toward the explanation of between subjects variance. Because cell sizes were slightly unequal, the

contrast codes were weighted using procedures suggested by Wolf and Cartwright (1974) to restore orthogonality.

The within-subjects' section of the ANOVAs used period effects and period by between-subject contrast interactions. The period effects used the first hour as a base and reflected the magnitude and direction of changes from that base.

The study examined eight dependent variables within an ANOVA framework: units produced (UP), general arousal (GA), general affective tone (GAT), personal competence (PC), general satisfaction with pay (GSP), equity of pay (EP), attractiveness of fellow workers (AFW), and attractiveness of task (AT). Repeated measure ANOVAs were completed for each of the dependent variables using the procedure described by Cohen and Cohen (1975).

Repeated measure ANOVAs also were computed for evaluations of performance and bonus expectations. Although the procedure used was similar to that for the other dependent variables, it should be noted that the initial expectations and evaluations were made prior to the bonus treatment. Each subsequent expectation and evaluation also was completed before the hourly bonus announcement.

RESULTS

Several of the hypotheses can be examined directly within the results of the ANOVAs. Table 1 gives the amount of variance attributable to

TABLE 1
Significant Variance Accounted for by ANOVA Effect by Dependent Variable^a

Source of Variation	Dependent Variable ^b							
	UP	GAT	GA	PC	GSP	EP	AFW	AT
<i>Between subjects</i>	.69	.84	.72	.73	.87	.89	.82	.85
MCT	+.13**				+.05*			
TIOC						-.04*		
Bonus-no-bonus		+.19**		+.12**	+.22**	+.21**		
High-low performance	+.20**							
Appropriately-inappropriately paid								
<i>Within subjects</i>	.31	.16	.28	.27	.13	.11	.18	.15
Session 2	+.08**	-.01**	-.05**	-.01**	-.01**			-.01**
Session 3	+.06**	-.02**	-.07**	-.02**				-.01**
S2 × bonus			+.01*		+.01**		+.00*	+.00*
S2 × performance								
S2 × appropriately								
S3 × bonus					+.01**			
S3 × performance	-.01*							
S3 × appropriately								
Total significant R ²	.48	.22	.13	.15	.30	.25	.00	.02

^a + = effect positively related to dependent variable, - = effect negatively related to dependent variable.

^b UP = units produced, GAT = general affective tone, GA = general arousal, PC = personal competence, GSP = general satisfaction with pay, EP = equity of pay, AFW = attractiveness of fellow workers, and AT = attractiveness of task.

* $p < .05$

** $p < .01$

between and within-subjects variance, the covariates and experimental conditions significantly related to each dependent variable together with the amount of variance accounted for by that effect, the direction of the relationship of that effect, and the total amount of variance significantly accounted for by the covariates and effects. At the outset, it should be noted that for each dependent variable, by far the largest proportion of the total variance is accounted for by the covariates and between-subjects effects. Relatively little variance is explained by within-subjects effects with the exception of the increase in units produced and the relatively large decline in general arousal over the course of the experiment.

Hypothesized Relationships

It was hypothesized that satisfaction would be related to reward magnitude. The results in Table 1 show that four of the seven satisfaction areas—general affective tone, personal competence, general satisfaction with pay, and equity of pay—all were highly related to reward treatment.

Consistent with Cherrington et al.'s (1971) findings, performance and satisfaction were unrelated. With subjects split into high and low performing groups on the basis of first hour performance, no relationship between performance level and any of the satisfaction measures was found either between subjects or within subjects across sessions.

Cherrington et al. (1971) found a significant difference in performance in favor of contingently rewarded subjects during the second session of their experiment. Although the same pattern of changes was found here, the magnitudes were not sufficient to produce significant between- or within-subjects effects. In fact, the only significant effects on units produced were significant improvements in both the second and third sessions, suggesting some continued learning effects, and a relatively greater increase in units produced during the third session by initially lower performers. This may be the result of either a plateau in the possible maximum output curve reached earlier by initially higher producers or a regression effect due to initial output being used as the basis for performance treatment assignment. Table 2 provides data on units produced by treatment group.

Subjects were asked to assess their performance and project their expectations for a bonus receipt at the end of each work session. Cherrington (1973) found that unrewarded subjects were significantly less likely to expect rewards in subsequent sessions than were rewarded subjects. Those receiving rewards had enhanced expectations. It is not clear, however, what factors influenced that change in reward expectations. In this study, although evaluations of performance and bonus expectations were highly correlated (first hour, .75; second hour, .78; third hour, .78; between subjects across sessions, .80), the treatment effects operate differently on each when the ANOVAs are computed.

TABLE 2
Means, Standard Deviations, and Correlations for Units Produced
by Reward and Performance Condition Across Sessions

Measure	Groups ^a						
	Total N=76	AP N=40	IN N=36	BHP N=20	NBLP N=20	BLP N=18	NHBP N=18
<i>Mean</i>							
Session 1	93.57	92.93	94.19	106.95	78.90	83.00	105.39
Session 2	107.29	108.05	106.44	120.25	95.85	98.22	114.67
Session 3	109.82	110.10	109.47	120.05	100.15	103.17	115.78
<i>Standard Deviation</i>							
Session 1	19.47	20.35	18.71	13.71	15.75	17.67	11.98
Session 2	17.51	19.14	15.73	12.78	16.58	13.19	13.86
Session 3	18.73	19.86	17.66	17.11	17.57	15.40	17.91
<i>Correlation^b</i>							
r_{13}	.72	.76	.66	.68	.59	.67	.65

^aAP = appropriately rewarded subjects, IN = inappropriately rewarded subjects, BHP = high performers receiving the bonus, NBLP = low performers not receiving the bonus, BLP = low performers receiving the bonus, and NBHP = high performers not receiving the bonus.

^bAll correlations significant, $p < .01$

About two-thirds of the variance for evaluations of performance was associated with between-subjects effects. Of this 67 percent, however, only 4 percent was significantly accounted for, this portion being associated with MCT scores. Thus, between-subjects variance was not associated with bonus receipt or initial performance levels. Within subjects, an additional 1 percent of the variance was associated with receipt of the bonus during the third hour. This would mean that subjects who received the bonus during the first and second hour evaluated their third hour performance (prior to bonus receipt) higher than did previous non-recipients.

Variance in bonus expectations was split 70 percent/30 percent for between/within subjects sources. Approximately 15 percent of the total variance was significantly explained and was split 10 percent/5 percent among between/within subjects sources. Between subjects both bonus recipients and higher performers had higher bonus expectations. Within subjects an effect was found for both initial and subsequent bonus receipt with the magnitude increasing. Initially high performers downgraded their expectations somewhat after the first session, but did not do so further after the second. Table 3 displays the significant effects.

Cherrington (1973) suggested that satisfaction would spread from pay aspects to other measures as the result of reward receipt. This hypothesis can be tested cross-sectionally and longitudinally by this experiment. First, from a cross-sectional standpoint, the average interfactor correlation is .47, indicating a degree of common variance among the measures. Four of the seven measures are highly related to bonus receipt, supporting the spread of effect hypothesis. But the longitudinal results are not highly supportive. First, as Table 1 shows, a large proportion of the total variance in satisfaction can be attributed to between- rather than within-subjects

TABLE 3
Significant Variance Accounted for by ANOVA
Effect for Evaluations of Performance
(EOP) and Bonus Expectations (BE)^a

<i>Source of Variation</i>	<i>EOP</i>	<i>BE</i>
<i>Between subjects</i>	.67	.70
MCT	+ .04*	
TIOC		
Bonus-no-bonus		+ .06**
High-low performance		+ .04*
Appropriately-inappropriately paid		
<i>Within subjects</i>	.33	.30
Session 2		
Session 3		
S2 × bonus		+ .01*
S2 × performance		— .01*
S2 × appropriately		
S3 × bonus	+ .01*	+ .03**
S3 × performance		
S3 × appropriately		
<i>Total significant R²</i>	.05	.15

^a+ = effect positively related to dependent variable, — = effect negatively related to dependent variable.

* $p < .05$.

** $p < .01$.

effects. Second, within subjects, the spread of effect would be demonstrated by a period-by-bonus interaction. The results show this interaction for three of five nonpay factors for the second hour (GA, AFW, and AT) and only general satisfaction with pay for the third. It also should be noted that none of these interactions accounts for more than 1 percent of the total variance in satisfaction measures.

Equity theory would suggest that subjects who receive outcomes inconsistent with inputs will be less satisfied. Obviously, subjects were not given feedback on their actual production rates, but the evaluation of performance-units produced correlation indicates that subjects did make reasonably valid initial judgments about their effectiveness. To support the hypothesis, appropriately paid subjects would have to have been more satisfied. Neither the appropriateness main effect nor the period by appropriateness interactions support this hypothesis.

Subjects who endorsed ambiguous items as job inputs were significantly less satisfied with equity of pay, but not with general satisfaction with pay. This supports Tornow's (1971) contention that reactions to rewards may be moderated by an individual difference. It is noted that none of the other satisfaction measures was significantly related.

DISCUSSION

Two major sections of the results need discussion: first, the effect of appropriate and inappropriate rewards and individual differences on

satisfaction and performance; second, the influence of employer feedback of performance levels on expectations and self-evaluation.

Reward Appropriateness

The results of this study are generally similar to those in Cherrington et al. (1971), but the effect of monetary rewards on other facets of satisfaction was more limited in this study and no performance improvements associated with positively-contingent rewards were found here. This study explicitly examined the role of initial prereward performance and individual differences on subsequent performance and satisfaction. The Cherrington et al. study reported only the influence of reward contingencies. However, the present study reports results for females only while Cherrington et al. used both males and females.

The inclusion of initial performance levels, rewards, and appropriateness of rewards allowed a test of the "performance causes satisfaction" model. The data did not support this model. Performance, in itself, was not significantly related to satisfaction. Performance-contingent rewards (by themselves) also did not contribute to satisfaction. It is clear that what did predict satisfaction was reward receipt, regardless of its contingency or noncontingency. It also is clear here that reward receipt did not lead to higher performance in subsequent periods, whether appropriately or inappropriately administered.

In terms of individual differences, the ability measure significantly predicted performance and also was related to general satisfaction with pay even though ability was unrelated to rewards. This may mean that higher ability subjects might have been able to devote less effort or work more efficiently on a task suited to that ability. Ability scores were unrelated to attractiveness of task, indicating that ability-job fit, by itself, does not necessarily enhance the degree of satisfaction one might gain through employment. Individuals who scored higher on the TIOC were significantly less likely to perceive the pay system as equitable, but they did not express lower levels of satisfaction with the pay itself, suggesting that this measure may be specific to relative rather than absolute compensation treatment.

Generally, the results would support the following performance-satisfaction interpretations: (a) abilities cause performance; (b) performance predicts subsequent performance; and (c) rewards cause satisfaction. Do these results suggest that the organization has little power to influence performance through rewards?

One major assumption that must be made if contingent rewards are to cause behavior is that the rewards are reinforcing. Mawhinney clearly distinguished between rewards and reinforcers. "Reinforcers and punishers are functional tautologies that serve to classify stimuli in terms of their effects on response rates when made contingent on a response" (1975, p. 705). If the rewards do not affect the response rate, they are not

reinforcers. Extending this approach to the definition of rewards, one could suggest that rewards also be considered as functional tautologies to classify organizationally-mediated outcomes in terms of their effects on (self-reported) satisfaction. Rewards thus are not necessarily reinforcing, but if they are, simultaneous improvements in performance and satisfaction with specific rewards would be expected.

What is reinforcing performance in this experiment if pay is not? It is fairly obvious that pay is not a reinforcer because the reward factor and its interactions with time were not significantly related to performance. Scott and Cherrington (1974) noted that subjects in competitive conditions produced more than did those in cooperative or individualistic conditions. This experiment was explicitly competitive. One explanation is that society conditions individuals to view competition as eliciting high performance. The competition itself then may be responsible for the failure of the rewards to reinforce.

There is an alternative explanation. Persons who have learned to work for pay and who have *applied* for a job because they have been told that certain relative response levels will lead to specific levels of reward, and who then do not experience these at the highest level, may act if they were in an *extinction* rather than a *reinforcement* situation. It is highly likely that individuals have learned to exert high levels of effort in competitive situations. Past positive outcomes associated with competitive situations cause high effort behavior in this study's task. One might expect that nonreceipt of a bonus is akin to nonreceipt of a reinforcer and would lead to extinction over time. The data from Table 2 do not support this idea, however. There is no decrease in performance of nonrewarded subjects relative to rewarded subjects, nor is there an increase in the variance of their performance as measured by an increase in the standard deviations in units produced or a reduction in the correlation between first and third hour units produced. It is probably too much to ask to demonstrate extinction in a three-trial experiment involving competitive conditions with an implied VR reward schedule (bonus if above median performance).

What are the practical implications of nonreinforcing rewards on long run organizational goals? Organizations and the behavior of individuals who populate these organizations are substantially more complex than those explored in this study. In this study the measured behavior of interest to the organization (units produced) was not affected by rewards, but other behaviors were: specifically, self-reports of satisfaction and personal performance evaluations. Rewards probably are as likely to reinforce multiple behaviors as they are to affect multiple facets of satisfaction. What the organization must do is catalog the major relevant behaviors for which a change is desired and maintain rewards that have a net balance of reinforcing properties for behaviors contributing to organizational effectiveness. For example, if monetary rewards do not reinforce performance (e.g., higher relative increases do not lead to higher relative subsequent performance improvements), but the organization continues a

contingent reward system for high performers, these rewards would be reinforcing if turnover of higher performers was less than that of lower performers. Cherrington et al. (1971) noted that noncontingent rewards could produce negative responses in areas other than that associated with the rewards. To an extent, what is suggested is that the spread of effect could be measured for behaviors as well as satisfaction when a given reward is allocated.

Effects on Self-Evaluations and Expectations

The first finding having impact for organizational applications is that high performers were not significantly likely to evaluate their own performance higher than that of low performers over the course of the experiment. Those with higher MCT scores evaluated their performance more positively, and because MCT scores and performance were correlated, the order of variables entered into the regression reduces the performance effect contribution. In a relatively simple task situation, subjects were not significantly able to perceive accurately their own relative performance independent of ability. Early feedback would appear important to establish accurate perceptions. In this case, the bonus treatment was not sufficient to alter judgments on performance.

Bonus expectations did become increasingly related to bonus treatment during the study. Subjects did appear to learn the past-bonus→future-bonus relationship. This also is supported by the negative relationship for the session 2 \times performance interaction. Performance, per se, was downgraded as an input to bonus expectations. What the results may show is that bonus receipt in this noncontingent system reinforces the belief that maintenance of past behavior is sufficient to obtain future rewards.

Conclusion

Unfortunately, neither the earlier experiment by Cherrington et al. (1971) nor this study is of sufficient duration to simulate an ongoing situation in which noncontingent rewards exist. Thus, no conclusion can be drawn in relation to any reinforcing effects of a seemingly noncontingent system (viewed from a performance standpoint). It is important to note the effects of the noncontingent system on expectations and satisfaction; however, and the potentially deleterious effects likely to follow for the rewarding organization.

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A Dyadic Interpretation of the Contingency Model of Leadership Effectiveness¹

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To test the utility of a dyadic approach to the study of leadership, conditions specified by Fiedler's contingency model of leadership effectiveness were created for Air Force personnel. A set of dyadic predictions was tested with ANOVA and correlational techniques. Results provided mixed support for a dyadic approach to the study of leadership.

Researchers are presently confronted with two conceptual approaches to analyzing the phenomena of leadership. The earlier, and more prevalent, approach utilizes an aggregate group level of analysis. Researchers who follow the guidelines of this approach employ group averages when assessing variables of interest (e.g., mean group satisfaction with the leader, mean group performance, mean group perception of the leader's style).

As an alternative to the aggregate group level approach, the dyadic level of analysis has been urged by Dansereau, Graen, and Haga (1975). The dyadic approach rejects the traditional view of studying leader behaviors in relation to the entire group in favor of studying how each group member negotiates his role with the leader. The focus of the dyadic approach is on the exchange relationship that develops between each group member and the group leader. According to this approach, two assumptions are implicit in the traditional group view of leadership: (1) Group members are highly similar along dimensions of perception and reaction, such that all group members may be dealt with conceptually, as well as operationally, as a single entity; (2) Leaders relate to each group member in a similar manner. Both of these assumptions are seen as unwarranted

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and misleading by advocates of the dyadic approach (Dansereau, Cashman, & Graen, 1973; Graen, 1976).

The paradigm proposed by Dansereau et al. (1975) describes leaders as discriminating among subordinates and dealing with them as individuals, such that certain subordinates receive leadership-exchange opportunities while others are merely supervised. It is expected that, over time, the group members become separable into two subgroups, the "trusted assistants" (IN-group) and the "ordinary members" (OUT-group). The significance of the IN-OUT distinction lies in its implication that the results obtained on an entire group should be studied in conjunction with the results obtained for each subgroup. This would be necessary because it is expected that the subgroups will differ on many attitudinal and behavioral dimensions (e.g., satisfaction, involvement, motivation).

The contingency model of leadership effectiveness (Fiedler, 1967a) provides a framework for the simultaneous study of group and dyadic levels of analysis. By defining leader-member relations in a dyadic (rather than a group) sense, the contingency model predicts that leaders will be differentially effective with members of their IN-group and OUT-group. For example, an IN-group member under a high or low least preferred co-worker (LPC) leader with favorable position power, when working on a task comparatively high on structure, is functioning in Octant I but an OUT-group member of the same group is functioning in Octant V. The predictions, in relation to leader effectiveness, are as follows: low LPC leaders will be more effective in dealing with their IN-group members in Octants I, II, III, V, VI, and VII relative to high LPC leaders in these octants; high LPC leaders will be more effective in dealing with their IN-group members in Octants IV and VIII relative to low LPC leaders; high LPC leaders will be more effective in dealing with their OUT-group members in Octants I, II, III, V, VI, and VII relative to low LPC leaders; and low LPC leaders will be more effective in dealing with their OUT-group members in Octants IV and VIII relative to high LPC leaders. A representation of these hypotheses is presented in Table 1.

TABLE 1
Predicted Interactions

<i>Octant</i>	<i>Subgroup</i>	<i>High Task Structure</i>	<i>Octant</i>	<i>Subgroup</i>	<i>Low Task Structure</i>
I	IN	High LPC-lower	III	IN	High LPC-lower
	OUT	High LPC-higher		OUT	High LPC-higher
II	IN	High LPC-lower	IV	IN	High LPC-higher
	OUT	High LPC-higher		OUT	High LPC-lower
V	IN	High LPC-lower	VII	IN	High LPC-lower
	OUT	High LPC-higher		OUT	High LPC-higher
VI	IN	High LPC-lower	VIII	IN	High LPC-higher
	OUT	High LPC-higher		OUT	High LPC-lower

An alternative method of assessing the usefulness of defining leader-member relations at a dyadic level is provided by examining the performance of IN-group and OUT-group members via rank-order correlations between leader LPC and performance. Table 2 displays the predicted directions of rank-order correlations.

TABLE 2
Predicted Directions of Rank-Order Correlations
(LPC with Subordinate Performance)

	I	II	III	IV	Octant V	VI	VII	VIII
Subgroup								
IN	-	-	-	+	-	-	-	+
OUT	+	+	+	-	+	+	+	-

Another point of interface between the dyadic approach and the contingency model lies in a possible dyadic interpretation of the entire favorability dimension. Specifically, IN and OUT-group members, relative to their leader, are providing high favorability and high unfavorability. As a result, low LPC leaders (according to the contingency model) should be more effective in dealing with their IN and OUT-group subordinates than are high LPC leaders to the degree that leaders are confronted with a situation that combines extreme favorability and extreme unfavorability. Therefore, when main effects of LPC are obtained, the predicted direction of these effects is that low LPC-led IN and OUT members will display superior performance relative to high LPC-led IN and OUT members. This proposed redefinition of favorability is solely in terms of dyadic relations and is independent of the parameters of task structure and position power. Recent empirical evidence, reported by Beach and Beach (1978), points to the relatively greater importance of interpersonal relations in comparison to task structure and leader position power as components of perceived favorability. The empirical weights of these three parameters of favorability were determined to be 11:4:1 for leader-member relations, task structure, and position power, respectively. Beach and Beach (1978) also reported findings that suggest that it is reasonable to assume an independent, additive view of the three proposed parameters of favorability.

The dyadic conceptualization of Graen and his colleagues proposes that whether members are motivated to greater achievement primarily by intrinsic considerations or by extrinsic considerations depends in part on their individual IN-OUT status. Specifically, it is predicted that OUT-group members will demonstrate superior performance when their leader possesses the ability to administer sanctions (i.e., when the leader is, in Fiedler's terms, in a situation of high position power) relative to a situation in which the leader is comparatively powerless. Conversely, IN-group

members will display superior performance when motivated primarily by intrinsic factors (e.g., personal commitment to the leader) rather than extrinsic considerations. Simply stated, groups led by leaders possessing high position power will have more effective OUT-group performance than will groups led by leaders possessing comparatively less position power, and IN-group members will exhibit superior performance when directed by leaders relying largely on intrinsic motivators (i.e., low position power) relative to leaders possessing high position power. Although phrased in terms of the position power parameter, this prediction is deducible within the dyadic approach and is independent of Fielder's model.

In sum, the present study addressed the following hypotheses:

1. *Low and high LPC leaders will be differentially effective with their respective IN-group and OUT-group members as a consequence of IN-group members being in Octants I-IV while OUT-group members occupy Octants V-VIII.*
2. *Low LPC leaders will be more effective relative to high LPC leaders in a setting that combines the extremes of good and poor leader-member relations.*
3. *IN-group members will exhibit superior performance relative to OUT-group members when the leader is unable to provide extrinsic motivators, but the ability of a leader to provide an extrinsic motivator will result in OUT-group member performance surpassing IN-group member performance.*

METHOD

For purposes of squad experience, 48 4-man groups were formed from a pool of enlisted trainees stationed at a U.S. Air Force Base located in the Midwest. Trainees who scored higher or lower by one standard deviation relative to the mean on LPC were selected to serve as group leaders. The mean and standard deviation were taken from normative data on LPC reported by Posthuma (1970). Prior to the formation of the groups, each of the designated leaders listed his sociometric choices using alternation-ranking of his five most preferred and five least preferred barrack's mates. One half of the leaders were assigned one least preferred and two most preferred barrack's mates as subordinates. The remaining leaders received an assignment of two least preferred and one most preferred subordinates. Also, a leader did not receive his sociometrically most or least preferred barrack's mate if the leader failed to rate him in a proper direction on a 7-point *warm-cold* scale. The assignment of subordinates, based on leaders' sociometric choices, was designed to produce IN and OUT subgroups in each group and to produce, overall, good and poor leader-member relations for leaders. Each group met for two situational test sessions scheduled between the fifth and tenth weeks of the trainees' stay on the base.

To induce high position power, one half of the groups were informed at the outset of each group session that the group's leader would recommend extra duty or relief from duty to the squadron commander for each group member based on his performance in the group session. Low position power, in a comparative sense, was induced by not informing the remaining groups that the assigned leader would be given any formal power.

Following the position power induction all groups proceeded to work on the following coacting tasks: (1) NASA moon problem (Hall, 1971)—high task structure; (2) cities-ranking task (Shaw, 1963)—high task structure; (3) military fable task (Shaw, 1963)—low task structure; (4) fame-and-immortality task (Shaw, 1963)—low task structure. The order of presentation of the task types was counterbalanced. (Since the model's first formal exposition, in 1967, its validity for coactive performance has been questioned. Although comparatively little coactive data have been reported [Bates, 1967; Fiedler, 1967b; Hill, 1969; Hunt, 1967; McNamara, 1967], Fiedler has argued for the model's applicability to coactive performance: "The data . . . suggests that the distinction between interacting and coacting task groups might be unnecessary" [1971, p. 146]. Coacting tasks were selected for the present study because they facilitate the identification of a group member's contribution.)

In summary, each group was constructed such that leader-member relations were predominantly favorable or unfavorable relative to the leader (with a sociometrically defined IN-group and OUT-group member in each group). Second, each group was under the direction of a high or low LPC leader. Third, each group was in a condition of high or low leader position power. Finally, each group worked on all tasks. (For additional information regarding these procedures, see Vecchio, 1977.)

The high task structure tasks (NASA moon problem and cities-ranking task) were scored by summing the absolute difference between each respondent's ranking and the correct ranking (such that a lower score indicates superior performance). The low task structure tasks were scored for both quantity and quality of performance. For the military fable task the dependent variables were: number of words written for the solution; whether a title was provided as per instructions; and 7-point Likert scale ratings of originality, creativity, and overall quality by two raters (in total, eight dependent variables). For the fame-and-immortality task, four dependent measures were derived: total number of solutions generated; number of solutions generated that were correct per the instructions for the task; and overall quality ratings on a 7-point scale by two raters.

For the sake of economy and because of moderate positive correlations among the dependent measures for each low task structure task (median $r = .48$), number of words written for the military fable task and number of correct solutions for the fame-and-immortality task are reported as representatives of the low task structure tasks in the following analysis.

RESULTS

The predicted interactions derived from defining leader-member relations in dyadic terms were tested by a 2×2 (LPC \times IN-OUT) ANOVA.

TABLE 3
Summary of ANOVA for High Task Structure Tasks
(LPC \times IN-OUT)

<i>Octants (defined at group level)</i>	<i>Source</i>	<i>df</i>	<i>MS</i>	<i>F</i>
<i>I and III</i>	IN-OUT (A)			
	cities	1	10.67	1.42
	NASA	1	22.04	<1
	LPC (B)			
	cities	1	5.00	<1
	NASA	1	672.04	1.65
<i>II and IV</i>	A \times B			
	cities	1	80.67	10.71**
	NASA	1	22.04	<1
	A			
	cities	1	4.17	<1
	NASA	1	198.38	1.95
<i>V and VII</i>	B			
	cities	1	13.50	1.29
	NASA	1	92.04	<1
	A \times B			
	cities	1	.17	<1
	NASA	1	40.04	<1
<i>VI and VIII</i>	A			
	cities	1	48.17	4.68*
	NASA	1	10.67	<1
	B			
	cities	1	1.50	<1
	NASA	1	240.67	1.21
<i>VI and VII</i>	A \times B			
	cities	1	.17	1
	NASA	1	400.17	2.02
	A			
	cities	1	20.17	5.99*
	NASA	1	.38	<1
<i>VI and VIII</i>	B			
	cities	1	.17	<1
	NASA	1	3.38	<1
	A \times B			
	cities	1	4.17	1.24
	NASA	1	18.38	<1
	<i>Error</i>	<i>df</i>	<i>MS</i>	
<i>I and III</i>	cities	20	7.53	
	NASA	20	407.98	
<i>II and IV</i>	cities	20	10.50	
	NASA	20	101.77	
<i>V and VII</i>	cities	20	10.30	
	NASA	20	198.45	
<i>VI and VIII</i>	cities	20	3.37	
	NASA	20	149.14	

* $p < .05$

** $p < .01$

The results of these analyses are presented in Table 3 for high task structure tasks and Table 4 for low task structure tasks. Cell means for the dependent variables are listed in Table 5. A summary of the results presented in Tables 3 and 4 is provided in Table 6. The summary suggests

TABLE 4
Summary of ANOVA for Low Task Structure Tasks
(LPC \times IN-OUT)

<i>Octants (defined at group level)</i>	<i>Source</i>	<i>df</i>	<i>MS</i>	<i>F</i>
<i>I and III</i>	IN-OUT (A)			
	fable words	1	13.50	<1
	correct solutions	1	12.04	4.74*
	LPC (B)			
	fable words	1	1980.17	<1
	correct solutions	1	5.04	1.98
<i>II and IV</i>	A \times B			
	fable words	1	748.17	<1
	correct solutions	1	15.04	5.92*
	A			
	fable words	1	1426.04	<1
	correct solutions	1	1.50	<1
<i>V and VII</i>	B			
	fable words	1	210.04	<1
	correct solutions	1	42.67	3.10
	A \times B			
	fable words	1	852.04	<1
	correct solutions	1	.67	<1
<i>VI and VIII</i>	A			
	fable words	1	54.00	<1
	correct solutions	1	.67	<1
	B			
	fable words	1	14900.17	7.89**
	correct solutions	1	.67	<1
	A \times B			
	fable words	1	2090.67	1.11
	correct solutions	1	4.17	<1
	A			
	fable words	1	1001.04	<1
	correct solutions	1	4.17	1.77
	B			
	fable words	1	35.04	<1
	correct solutions	1	13.50	5.74*
	A \times B			
	fable words	1	852.04	<1
	correct solutions	1	10.67	4.54*
<i>Error</i>		<i>df</i>	<i>MS</i>	
<i>I and III</i>	fable words	20	2035.70	
	correct solutions	20	2.54	
<i>II and IV</i>	fable words	20	2118.19	
	correct solutions	20	13.75	
<i>V and VI</i>	fable words	20	1888.15	
	correct solutions	20	4.82	
<i>VII and VIII</i>	fable words	20	1305.42	
	correct solutions	20	2.35	

* $p < .05$

** $p < .01$

TABLE 5
Cell Means

Octant (Defined at group level)	Task Structure		High LPC Leader		Low LPC Leader	
			IN	OUT	IN	OUT
I and III	High	cities	10.00	5.00	7.33	9.67
		NASA	35.33	35.33	47.83	44.00
	Low	fable	76.00	88.67	105.33	95.67
II and IV	High	correct solutions	2.33	2.17	1.67	4.67
		cities	7.00	7.67	8.33	9.33
	Low	NASA	50.33	42.00	43.83	40.67
V and VII	High	fable	77.83	105.17	95.67	99.17
		correct solutions	2.17	2.00	5.17	4.33
	Low	cities	7.33	10.00	6.67	9.67
VI and VIII	High	NASA	43.17	52.67	45.00	38.17
		fable	61.83	83.50	130.33	114.67
	Low	correct solutions	1.83	3.00	3.00	2.50
VI and VIII	High	cities	5.33	6.33	4.67	7.33
		NASA	42.83	44.33	45.33	43.33
	Low	fable	104.50	79.67	90.17	89.17
		correct solutions	4.17	2.00	1.33	1.83

TABLE 6
Summary of Support for Predicted Interactions^a

	I & III	Octants Defined at Group Level II & IV	V & VII	VI & VIII
High task structure				
cities	s*	ns	s	s
NASA	ns	s	s	ns
Low task structure				
fable words	s	ns	ns	s
correct solutions	ns	ns	ns	s*

^as—indicates direction of means is supportive of prediction; ns—indicates failure to support prediction.

*Interaction attains or exceeds the .05 level of significance.

that the dyadic definition of leader-member relations was not strongly supported in the present study. When the predicted interactions were supported, they tended to be in the extreme favorability octants of the model (where, intuitively, the model should be strongest).

The utility of defining leader-member relations at a dyadic level also was assessed by rank-order correlations between LPC and performance for sociometrically most and least preferred co-workers. A summary of the rank-order correlations is presented in Table 7. The rank-order correlation analysis offered a greater degree of support for the model. This support was due solely to the results of sociometrically most preferred co-workers.

From an assumption that the simultaneous presence of extremely most preferred and least preferred subordinates results in a situation that combines the opposite extremes of favorability, the prediction was derived that low LPC leaders will be more effective in dealing with their group members relative to high LPC leaders. Of 14 dependent variables

TABLE 7
Ratios of Rank-Order Correlations in the
Predicted Direction Relative to Total Number of Rank-Order
Correlations—LPC and Performance^a

<i>Ratios and Probabilities</i>	
Sociometrically most preferred co-worker (IN)	38/55
Binomial <i>p</i>	.003
Sociometrically least preferred co-worker (OUT)	19/56
Binomial <i>p</i>	.011 ^b
Total	57/111
Binomial <i>p</i>	.390

^aRank-order correlations of zero are not included in the summary.

^bDenotes probability is based on ratio less than one-half.

examined for IN and OUT-group members, 25 of 28 mean differences (high LPC versus low LPC) were in the predicted direction ($p < .0001$, binomial test).

The prediction was supported that OUT-group members (sociometrically least preferred co-workers) would exhibit superior performance when their leader possesses formal position power (relative to OUT-group members under leaders without position power), while IN-group members (sociometrically most preferred co-workers) would exhibit superior performance when their leader does not possess formal position power. Of 14 dependent variables examined for IN and OUT-group members, 22 of the 28 mean differences (high position power versus low position power) were in the predicted direction ($p < .002$, binominal test). This finding confirms the value of the dyadic conceptualization for studying leadership, without direct implication for the validity of the contingency model (in that the prediction is derivable outside the framework of the model).

DISCUSSION

The suggestive results of the ANOVA tests for interactions (LPC \times IN-OUT) in conjunction with the mixed results of the correlational analysis indicate that a dyadic perspective may be of merit, exclusive of the contingency model. That is, the finding that a significantly greater than chance proportion of correlations were in the predicted direction for IN-group members and a significantly less than chance proportion for OUT-group members suggests that an interpersonal process, with dynamics other than those specified by the contingency model, may be operating. The explication of the precise nature of such a process requires further inquiry into dyadic exchange relationships.

The present finding that low LPC leaders were more effective, relative to high LPC leaders, also is supportive of the dyadic approach. However, the main effect nature of this finding casts doubt on the utility of the contingency notion for the topic under study. As Korman (1973) has noted,

contingency hypotheses should be included in a theory only if they are empirically supported and shown to be necessary. Being mindful of Korman's cautions (e.g., the problem of measuring the "critical values" of contingency variables and the limitations of investigating static models), the present results argue for a simpler, main effect model. Although contingency models intuitively are more appealing than main effect models, the "robustness" of simple linear models (Yntema & Torgerson, 1961) coupled with the problems noted by Korman may retard the development and validation of contingency models in the area of leadership.

The present finding that "leader's ability to bestow extrinsic rewards" is differentially related to subordinate performance also is supportive of the dyadic approach. This result implies that a leader who wishes to maximize his/her subordinates' performance will be alert to differences in subordinates' preferences for intrinsic and extrinsic incentives. A priority of future research should be the determination of whether the more successful leaders are aware of and make use of their subordinates' reward preferences when attempting to influence their behavior. Evidence in support of this proposition would fit well with Jacobs's definition of leadership as "an interaction between persons in which one presents information of a sort and in such a manner that the other becomes convinced that his outcomes (benefits/costs ratio) will be improved if he behaves in the manner suggested or desired" (1970, p. 232). Those leaders who better understand and manipulate their individual subordinate's benefits/costs ratio should, therefore, be more effective.

Further research should be directed, where possible, toward an examination of the utility of current leadership models at more micro and macro levels of analysis than the levels at which these models were originally developed. Also, the simultaneous study of multiple levels of analysis may enhance the precision of prediction by providing a unique source of systematic variance.

In summary, an investigation of the utility of a dyadic conceptualization of a major group-level theory of leadership yielded mixed support for both the dyadic predictions and the theoretic framework in which the predictions were tested. The findings of this study suggest the importance of including variables from multiple levels of analysis in studies of group performance.

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Research Notes

INSTITUTIONAL VERSUS QUESTIONNAIRE MEASURES OF ORGANIZATIONAL STRUCTURE: A REEXAMINATION

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Researchers historically have relied on two measurement approaches in their study of organization structure. The first is characterized by the obtaining of information from organization charts, personnel records, and other available documents or through interviews with key informants, e.g., a top manager. The second approach relies on the responses of a sample of organization members to a questionnaire. These responses then are aggregated in some fashion and the result is used as an indicator of structure. Since the two measurement approaches have been tacitly assumed to be measuring the same latent structural dimension, Pennings (1973) sought to determine the extent of their convergence.

Referring to the former as the institutional approach and the latter as the survey approach, Pennings collected data using both approaches from a sample of 10 manufacturing organizations. On analyzing the intercorrelations of multiple institutional and survey measures of both centralization and formalization, he found low convergence. In some cases, intercorrelations of the same dimension were in opposite directions (Pennings, 1973). Because some of his institutional measures were biased toward aspects of work flow departments, Pennings did find the convergence to increase somewhat when these measures were compared to the survey measures of production departments. Nevertheless, Pennings's results suggest that institutional and survey measures do not tap the same latent dimensions of structure.

In a recent extension of Pennings's study, Sathe (1978) examined the extent to which institutional measures of structure converged with questionnaire (survey) measures at the subunit level. Sathe suggests that the use of subunits alleviates some of the operationalization problems encountered by Pennings. Based on his analysis of the data collected from 22 departments in a multiline insurance company, Sathe found "(1) a low degree of convergence between institutional and questionnaire measures; (2) a negative association between the institutional measures of centralization and formalization; and (3) a positive association between the questionnaire measures of centralization and formalization" (1978, p. 233). Although his measures differ, Sathe's findings generally are consistent

with those of Pennings. Given his results, Sathe concluded that institutional and questionnaire measures should not be used interchangeably as they apparently tap different structures: institutional measures tap designed structure and questionnaire measures tap emergent structure.

Although the findings of Pennings (1973) and Sathe (1978) generally are consistent with each other, even though they employed different measures and different units of analysis, there are some potential problems that should be considered before accepting their conclusions. As Sathe points out, five of the organizations in Pennings's sample were branches and the other five were subsidiaries. Consequently, sample heterogeneity with respect to status (Child, 1972; Donaldson, Child, & Aldrich, 1975) may have biased Pennings's results with regard to centralization. Although Sathe's use of subunits from a single autonomous organization overcomes this limitation, it creates another in that all subunits were taken from the same organization. Characteristics of the containing organization are likely to influence the characteristics of its subunits (Duncan, 1972; Blau, 1970). Thus Sathe's results may be peculiar to the organization studied. Finally, although Sathe controlled for size and Pennings did not, neither study considered the potential bias of structural context, e.g., technology or environment.

In the discussion of his findings, Pennings recognized the possibility that third factors, such as context, could confound the relationship between institutional and questionnaire measures of structure. In this respect, research has shown that nonroutine technologies, uncertain environments, and small size tend to be associated with organic structures, whereas routine technologies, certain environments, and large size are associated with mechanistic structures regardless of whether institutional or questionnaire measures of structure are employed (Ford & Slocum, 1977). By the same token, Manning (1977) suggests that where tasks require individual discretion and allow for greater individual control over task relevant information, such as is found in nonroutine technologies or uncertain environments, the emergent structure will diverge from that designed.

This literature suggests that the failure of Sathe and Pennings to obtain convergence between their respective measures of structure, as well as their observance of differential relationships between measures of centralization and formalization, could be the result of their failure to control for such context factors as size, technology, and environment. Although Sathe did control for size, he did not consider the effects of technology or environment. Because Sathe's proposal that institutional and questionnaire measures be regarded as tapping different structures is predicated on results that consider only one potential confounding factor (size), the effects of other context factors should be assessed. In this respect, if it can be demonstrated that the relationships observed by Sathe and Pennings cannot be attributed to context factor confounding, then Sathe's argument is made stronger. On the other hand, demonstrated confounding would call Sathe's conclusions into question.

This paper reports the results of a study that considers the potential confounding influence of context factors on relationships between institutional and questionnaire measures. Using Sathe's (1978) institutional and questionnaire measures of structure, subunits from several different organizations are examined and the context factors of subunit size, technology, and environment are statistically controlled. The specific hypotheses, based on Sathe's findings are:

Hypothesis 1: Convergence between institutional and questionnaire measures of formalization, centralization, and differentiation will improve when size, technology, and environment are controlled.

Hypothesis 2: There will be a negative association between the institutional measures of formalization and centralization even when size, technology, and environment are controlled.

Hypothesis 3: There will be a positive association between the questionnaire measures of formalization and centralization even when size, technology, and environment are controlled.

Sample and Measures

The sample consists of 68 departments from 8 different organizations—a bank headquarters (3 departments), a chemical company (1 department), a sales office (6 departments), a department store (8 departments), a book publishing company (7 departments), an automobile importer (5 departments), an insurance company (13 departments), and an area university (25 departments). Only administrative, as opposed to academic, departments of the university were studied. Departments are the unit of analysis and they range in size from 4 to 112.

Consistent with Sathe (1978), institutional and questionnaire measures on centralization, formalization, and differentiation were collected from each department. Institutional measures were computed from information obtained from a questionnaire, identical to that used by Sathe in his interviews, given to the head of each department. Institutional measures for the three structural dimensions are: (1) centralization—Samuel and Mannheim's (1970) hierarchy of control index and the average number of hierarchical levels from each department member to the department head; (2) formalization—Inkson, Pugh and Hickson's (1970) documentation index; and (3) differentiation—the number of discrete functions in each department performed by at least one specialist, the number of job titles, and Samuel and Mannheim's (1970) functional diversification index.

Questionnaire measures were obtained from responses of department members to a perceptual structure scale based on Sathe's (1978) scale. In order to establish department scores for the questionnaire measures, each respondent was treated equally, scores were totalled, and an average computed. (It should be noted that aggregated individual data must be used with caution for the reasons given by Firebaugh [1978]. In this case, however, the aggregated data are being used as an analytical variable

[Lazarsfeld and Menzel, 1961] with no inferences being made back to the individuals from whom the data are collected.) Questionnaire measures for each of the three structural dimensions are: (1) centralization—a slightly longer (six versus five items) version of Sathe's centralization scale of comparable reliability (KR-8 of .799 versus Sathe's .864) and a participation in decision making scale (four items, KR-8 of .855); (2) formalization—a slightly longer version (six versus four items) of Sathe's rules and procedures scale of comparable reliability (KR-8 of .793 versus Sathe's .826); and (3) differentiation—a shorter version (three versus four items) of Sathe's division of labor scale with comparable reliability (KR-8 of .726 versus Sathe's .704).

In addition, measures of department size, technology, and environmental uncertainty were obtained. Size was measured as the logarithm of the total number of full time personnel in the department. Technology was measured with a routineness scale (KR-8 of .853) administered to department members, and environmental uncertainty was measured using Sathe's (1974) scale administered to department heads. A department technology score was computed by averaging the responses of department members. Sathe's uncertainty scale is a modification of Duncan's (1971) and has a higher level of internal reliability (KR-8 here of .909). The zero-order correlations among the context factors are: size and technology .39($p \leq .001$), size and environment .34($p \leq .01$), and technology and environment .13(n.s.).

Results

Before testing the specific hypotheses, it is necessary to assess the extent to which the organization influenced subunit values for the institutional and questionnaire measures. Firebaugh (1978) indicates that organizations, like other groups, have distinguishable properties, termed integral properties, that may influence the specific variables under investigation and that these effects should be considered.¹ The degree of organizational differentiation, for example, has been shown by Blau (1970) to be related to the degree of subunit differentiation. In this respect, if the organization, as a grouping variable (Firebaugh, 1978), has an effect on the respective measures, then the relationships among the variables also may be influenced. To test this possibility, a dummy variable was coded for each organization and regressed on each institutional and questionnaire measure. The regression showed no significant effects, indicating that there were no organization properties that influenced structure value. Therefore, the organization per se is not considered in the subsequent analyses.

Table 1 shows the zero-order correlations among the institutional and questionnaire measures as well as the partial correlations controlling for

¹The author would like to thank an anonymous reviewer of this journal for pointing this out.

TABLE 1
Intercorrelations of Institutional and Questionnaire Measures of Structure for Entire Sample ($N = 68$)^a

	FI ₁	CI ₂	CI ₃	DI ₄	DI ₅	DI ₆	FQ ₁	CQ ₂	CQ ₃	DQ ₄
<i>Institutional Measures</i>										
Formalization (FI ₁)	—									
Hierarchy of control (CI ₂)	.12 (.10)	—								
Number of vertical levels (CI ₃)	.11 (.19)	.46**** (.23)	—							
Functional diversification (DI ₄)	.07 (.12)	.30**** (.27)	.10 (.31)	—						
Number of functions (DI ₅)	-.02 (.11)	-.13 (-.13)	-.17* (.54)	.36**** (.45)	—					
Number of job titles (DI ₆)	-.02 (.02)	.15 (.14)	.11 (.37)	.15 (.19)	.04 (.29)	—				
<i>Questionnaire Measures</i>										
Rules and procedures (FQ ₁)	.37**** (.32)	.07 (.09)	.00 (.11)	.10 (.24)	-.06 (.05)	-.08 (-.11)	—			
Centralization (CQ ₂)	.13 (.05)	-.22** (-.16)	-.13 (-.35)	-.08 (-.13)	.02 (-.25)	-.35**** (-.43)	.31**** (.32)	—		
Participation (CQ ₃)	.08 (.00)	.01 (.00)	-.06 (-.38)	.26** (.01)	.28**** (-.14)	.10 (-.03)	-.01 (-.24)	-.12 (-.03)	—	
Division of labor (DQ ₄)	-.14 (-.17)	.18* (.14)	-.01 (-.32)	.32**** (.11)	.22** (-.13)	.17* (-.01)	-.07 (-.22)	-.16* (-.06)	.27** (.43)	—

^aF indicates formalization, C indicates centralization, and D indicates differentiation. Zero-order correlations are shown in parentheses.

* $p \leq .10$

** $p \leq .05$

*** $p \leq .01$

**** $p \leq .001$

size, technology, and environment. With respect to Hypothesis 1, it is seen that both the zero-order and partial correlations indicate a significant positive relationship between the institutional and questionnaire measures of formalization (FI_1 , FQ_1), with a very slight increase in the magnitude of this relationship resulting from controlling context. This significant relationship is contrary to Sathe's findings. Consistent with Sathe and Pennings, it is seen that there is a general lack of convergence between the respective centralization measures (CI_2 , CI_3 , CO_2 , CO_3) even when context factors are controlled. It should be noted, however, that the degree of divergence between institutional and questionnaire measures tends to decrease when context factors are controlled. Finally, although the zero-order correlations indicate a general lack of convergence between the institutional and questionnaire measures of differentiation (DI_4 , DI_5 , DI_6 , DQ_4), when context is controlled the convergence between these measures increases and becomes significant. This is contrary to Sathe's findings.

Contrary to Hypothesis 2, both the zero-order and partial correlations show a positive relationship between the institutional measures of formalization and centralization (FI_1 , CI_2 , CI_3) with the average magnitude of these relationships increasing slightly when context is controlled. Hypothesis 3 is supported when centralization (CQ_2) is used as a measure of questionnaire centralization, but not when participation in decision making is used (CQ_3).

Because Sathe's study was limited to a multiline insurance company, it is possible that his results are organization specific. To test this possibility, only the 13 departments in the multiline insurance company were analyzed. The results of that analysis, shown in Table 2, are essentially the same as those found in Table 1 with three notable exceptions. First, the hierarchy of control, the same institutional measure of centralization employed by Sathe, is negatively related to the institutional measure of formalization regardless of whether context is controlled. The relationship between these same two variables is positive in the overall sample. It thus appears that Sathe's finding on this relationship may have been organization specific. In this respect, it should be noted that the correlation between institutional formalization and the number of vertical levels is positive.

Second, when size, technology and environment are controlled, the degree of convergence between institutional and questionnaire measures of the division of labor is greater than when these factors are not controlled and is greater than that found in the overall sample. Of particular interest is the strong positive correlation (.78) between functional diversification and the division of labor, the two measures used by Sathe, after context is controlled as compared to the very low correlation (.12) prior to control.

Finally, the correlations between questionnaire measures of centralization and formalization tend to be stronger in the insurance company than is true for the sample as a whole. Ironically, before context is controlled,

TABLE 2
Intercorrelations of Institutional and Questionnaire Measures of Structure for Insurance Company (N = 13)^a

	FI ₁	CI ₂	CI ₃	DI ₄	DI ₅	DI ₆	FQ ₁	CQ ₂	CQ ₃	DQ ₄
<i>Institutional Measures</i>										
Formalization (FI ₁)	—									
Hierarchy of control (CI ₂)	-.06 (-.12)	—								
Number of vertical levels (CI ₃)	.22 (-.03)	.51* (.45)	—							
Functional diversification (DI ₄)	-.43* (-.19)	.62** (.50)	.09 (.38)	—						
Number of functions (DI ₅)	-.28 (-.12)	.13 (.16)	-.33 (.40)	.52* (.71)	—					
Number of job titles (DI ₆)	-.46* (-.53)	.40 (.39)	.54** (.17)	.53* (.17)	-.04 (-.23)	—				
<i>Questionnaire Measures</i>										
Rules and procedures (FQ ₁)	.47* (.52)	-.39 (-.13)	-.09 (.23)	-.26 (.18)	.03 (.27)	-.20 (-.34)	—			
Centralization (CQ ₂)	.44* (.55)	-.06 (-.07)	-.33 (-.18)	-.19 (-.04)	.24 (.19)	-.70*** (-.70)	.59** (.61)	—		
Participation (CQ ₃)	.29 (.17)	.03 (-.13)	.14 (-.30)	.18 (.01)	.68** (.22)	-.14 (-.08)	.35 (-.24)	.38 (.15)	—	
Division of labor (DQ ₄)	-.48* (-.47)	.27 (.07)	.03 (-.38)	.78*** (.12)	.38 (-.15)	.59** (.55)	-.35 (-.71)	-.43* (-.50)	.16 (.46)	—

^aF indicates formalization, C indicates centralization, and D indicates differentiation. Zero-order correlations are shown in parentheses.

* $p \leq .10$

** $p \leq .05$

*** $p \leq .01$

there is a negative correlation between rules and procedures and participation in decision making. After context is controlled, the relationship is positive.

Discussion

In general, the results of this study indicate (1) low convergence between institutional and questionnaire measures when context is not controlled, but greater convergence when context is controlled (supporting Hypothesis 1); (2) a positive association between institutional measures of centralization and formalization (contrary to Hypothesis 2); and (3) an average positive association between questionnaire measures of centralization and formalization (supporting Hypothesis 3). With the exception of Hypothesis 3, these findings are contrary to those of Sathe and Pennings. These results also suggest that some of Sathe's findings may be peculiar to his sample, an insurance company, in that relationships observed in the insurance company in this study, although similar to those found by Sathe, were not found in the overall sample. This is particularly true with respect to the association between institutional measures of centralization and formalization.

Although the results of this study indicate that confounding by the context factors of size, technology, and environment contributes to the lack of convergence between institutional and questionnaire measures, the extent and magnitude of that influence does not appear to be consistent across structural dimensions. Over the entire sample, controlling the context factors resulted in an average increase of .17 in the correlations between corresponding institutional and questionnaire measures. When considered separately, however, the correlations increased an average of .05 for formalization, .12 for centralization, and .26 for the division of labor. Therefore, the confounding effects of context factors in this study appear to be selective rather than pervasive.

Although controlling context factors increases the degree of convergence between the respective institutional and questionnaire measures, the overall average level of convergence (.19 absolute value, .07 arithmetic value) is still low. This suggests, consistent with Sathe's argument, that the respective measures may be viewed as tapping conceptually distinct structures. It should be noted, however, that although the general findings here support Sathe's notion of distinct structures, such support is not unequivocal. The formalization measures, for example, were significantly correlated in this study but not in Sathe's. This relationship, in conjunction with the increased convergence resulting from controlling the context factors and the differences in the relationships found in the insurance company subsample, suggests that there are other factors, in addition to the ones identified, that influence the extent to which institutional and questionnaire measures will converge. That is, it cannot necessarily be assumed

that the respective measures do not share any common elements, i.e., converge or overlap. Rather, as Hall (1972) suggests, the extent to which the respective measures converge is a function of the process(es) that allows for or inhibits convergence. One such process is that of leadership.

With respect to leadership, research evidence has found that context factors influence the structuring behavior of leaders (Osborn & Hunt, 1975) and that leader behavior is a significant correlate of questionnaire measures of structure (Ford, 1977). Because not all leaders are influenced by context factors in the same way or to the same degree, the structures they enact are likely to vary. To the extent that emergent structure is a function of leader behavior, and to the extent that the structure a leader enacts in response to contextual influences is contrary to that designed, there will be divergence between the measures. In the current study, for example, leaders may have enacted structures different from those designed in order to cope with characteristics of the contextual factors not seen by those implementing the designed structure. In this respect, Sathe suggests that emergent structures are mechanisms by which organizations adapt to short term variations such as those resulting from contextual change. When these factors are controlled, however, leaders may have less need to implement alternative structures and instead adhere more to designed structures, resulting in greater overlap and convergence. The extent to which leaders can do this, however, is likely to be influenced by organizational control.

Ouchi and Maguire (1975) suggest that organizations may employ one of two control strategies—output or method. With respect to output control, emphasis is placed on the consequence of action and not on the action itself. With method control, on the other hand, emphasis is placed on the process or action taken to produce some output. In the former case, there is greater potential for divergence between designed and emergent structure because the process—in this case, the emergent structure—is not controlled. On the other hand, if method control is employed, structure is controlled, allowing for fewer deviations. Consequently, there is likely to be greater convergence between designed and emergent structure if method control is employed. In this respect, it becomes necessary not only to determine the magnitude of designed structure, but also what it controls.

Aside from the issue of what processes or factors foster or inhibit convergence between measures, the results obtained here, in conjunction with those of Sathe and Pennings, indicate that researchers nevertheless should be cautious in making comparisons between studies in which different measures are employed. The preceding discussion suggests that such comparisons may be inappropriate as the structure considered may be the result of different processes and, therefore, not comparable. At the same time, however, consideration should be given to the role of each in the adaptation of organizations. Not only may emergent structure be the basis

for short term adaptation, but it also may be the basis for designed structure in later time periods. Thus, longitudinal studies should focus on this relationship.

Conclusions

The preceding discussion, when considered in light of other evidence, suggests that in cases in which institutional and questionnaire measures do not converge, they tap different structures. But this is not to say that such measures necessarily tap different structures. Rather, it is speculated that there are processes and factors, such as leadership and the type of organization control, that foster and/or inhibit convergence. Only when dimensions such as these are adequately considered can the extent to which the respective measures tap different structure be ascertained. Until that time, however, the results obtained here, as well as those presented by Sathe and Pennings, indicate that the measures do not tap the same structure and, therefore, should not be used interchangeably.

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DESIRES FOR AND PATTERNS OF WORKER PARTICIPATION IN DECISION MAKING AFTER CONVERSION TO EMPLOYEE OWNERSHIP¹

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Although North America is currently experiencing a resurgence of interest in and formation of business enterprises that are partly or completely owned by their employees, little research has been conducted on the effects of conversion to employee ownership on patterns of employee participation in decision making (PDM) within the firm. This is an important question because employee ownership has been advocated on the basis that it will enhance worker satisfaction and motivation and thus productivity and also that it will promote industrial democracy (Vanek, 1975; Derrick & Phipps, 1969). (Although, there frequently are other motives behind many conversions, such as a desire to obtain tax advantages under the U.S. Employee Retirement Income Security Act of 1974.) A change in traditional patterns of organizational influence may be crucial for attainment of both of these objectives. For example, Long (1978a) recently found that although individual share ownership does have positive effects on some key job attitudes, worker PDM apparently has much stronger effects.

Because actual patterns of participation are substantially dependent on desires for PDM, it also is important to assess the effects of employee ownership on these desires. In an extensive review of the literature, Hespe and Wall (1976) found that workers in conventional organizations expressed the greatest interest in participating in decisions directly relating to performance of their jobs, followed by matters concerning their immediate work units, with a very weak interest in participation in overall policy decisions. Reported actual amounts of worker PDM at each of the three decision levels were parallel to, but lower than, desired amounts. The gap between desired and actual PDM was highest at the department level and much lower at the other two levels.

There are at least two reasons to believe that these patterns of desires may differ under employee ownership. First, the proprietary interest held by employee owners might motivate them to take a greater interest in organizational policy and possibly in other decisions. Second, because the perceived legitimacy of worker participation is believed to affect desire for

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PDM (French, Israel, & As, 1960), legal share ownership may increase these desires by increasing perceived legitimacy, particularly in organizational policy.

Whether conversion to employee ownership would actually increase PDM, and at what decision levels, has been a subject of considerable debate. Although it does seem that the voting and informational rights attendant with employee ownership should give workers an opportunity for more influence, especially in organizational policy, the degree to which workers and managers desire worker PDM might affect realization of this opportunity. For managers, as well as nonmanagers, several forces may operate to increase desire for worker PDM. First, managers also may now view such participation as more legitimate. Second, managers may now expect workers to behave more responsibly if given increased PDM. Finally, they may wish to satisfy, at least partially, increased desires by workers for PDM. These forces might also increase PDM somewhat in job and departmental decisions, in addition to organizational policy.

Of major interest is the effect of time on these patterns. Poole argues that "the very act of participation would...increase the willingness to participate on future occasions" (1975, p. 4). His statement is based on the contention that intrinsic rewards accruing from PDM will further reinforce desire for participation. In an employee owned setting effective worker PDM could lead also to extrinsic rewards. If these forces do increase worker desire for PDM, and if managers perceive worker participation to be effective, then actual participation might also be expected to increase over time.

Method

Issues of PDM were explored through longitudinal research at a medium sized regional Canadian trucking company purchased from its former corporate owner by about 70 percent of its workers and managers about six months prior to the start of this study. The company employs about 165 people and is wholly owned by its employees. Nonemployees are not permitted to purchase or retain company stock, and all shares carry the usual voting and profit rights. Ownership is split between managers (46 percent) and nonsupervisory personnel, including a few foremen (54 percent). The board of directors consists of four managers, a supervisor, two truck drivers, and two outside directors and is chaired by the former general manager, who is also president. Directors meet monthly and receive a full set of financial statements prior to each meeting. All shareholders receive a monthly profit and loss statement and report from the president.

Few other structural or personnel changes have taken place subsequent to employee takeover, and no other mechanisms to increase PDM have been established. Notable changes that have occurred include a shift from large financial losses to considerable profitability, improved employee job

attitudes, and decreased turnover. Further details of this research are given elsewhere (Long, 1977, 1978b).

Two administrations of a comprehensive questionnaire took place about 6 months (wave 1) and 18 months (wave 2) after purchase. The questionnaires were unsigned. Wave 1 resulted in 87 usable questionnaires. Almost all (92.6 percent) of the 27 managerial respondents were shareholders, most (93 percent) were male, 66.7 percent had completed high school, the mean age was 37.3 years, and 26.7 percent came from an urban background. The 60 nonmanagers consisted of truck drivers (41.7 percent), clerical or secretarial employees (31.7 percent), mechanics (11.7 percent), and freight handlers (8.3 percent). Some 70 percent were shareholders, 55 percent were union members, 65 percent were male, the mean age was 32 years, and 41 percent had an urban background.

Wave 2 resulted in 82 usable questionnaires. Characteristics of the 30 managerial respondents were virtually identical to those at wave 1. The nonmanagerial group was quite similar to the group at wave 1 except that declines were noted in the proportions of shareholders (from 69.5 percent to 52 percent, reflecting a decline in the proportion of nonmanagerial shareholders in the firm as a whole) and full time employees (from 90 percent to 78.8 percent).

Following Hespe and Wall (1976), three major levels of decision making were used in measuring perceived worker participation, as indicated in the following question:

"How much say or influence do you feel that workers in this firm *actually* have in decisions about:

- (a) overall policies of the firm,
- (b) matters affecting their own departments,
- (c) how their own jobs are done."

The response scale ranged from 1 (no say at all) to 7 (very great deal).

Desire for worker PDM was measured with a question substituting "should have" for "actually have." A "decisional deprivation" score was obtained by subtracting actual levels from desired levels. Respondents also were asked to rate whether they believed that worker PDM at each decision level had changed since employee purchase.

Findings

Perceived Changes in Participation—Table 1 indicates that about half of the nonmanagers believed that worker influence had increased to some extent, not only at the organizational policy level, but also at the job and department levels, since employee purchase. In each case, however, quite small minorities believed that "considerable or great" increases had occurred. Managers had considerably stronger beliefs that worker PDM had increased at each level.

Desired and Actual Participation—As Table 2 indicates, nonmanagers believed that workers should have the highest influence in job level

TABLE 1
Perceived Changed in Participation,
Nonmanagers and Managers, Wave 1

	Percent			
	Decreased	Not Changed	Increased Slightly	Increased Considerably or Greatly
Nonmanagers' (N=42)				
perceptions of changes in workers' influence in:				
Job decisions	2.4	45.2	33.3	19.0
Departmental decisions	4.8	45.2	21.4	28.5
Organizational policies	7.2	42.9	26.2	23.8
Managers' (N=24)				
perceptions of changes in workers' influence in:				
Job decisions	—	20.8	45.8	33.3
Departmental decisions	—	29.2	41.7	29.2
Organizational policies	—	20.8	33.3	48.8

decisions, followed quite closely by departmental decisions, with desire for influence in organizational policies considerably lower. Worker-owners did *not* differ significantly from other workers in these desires. Managers were in close agreement with nonmanagers about how much PDM workers should have in departmental and organizational policy decisions, but desired significantly less in job decisions, resulting in a slightly different pattern of relative desires.

Nonmanagers believed that workers had the highest actual influence in job decisions, followed quite closely by departmental decisions, with PDM in organizational policies considerably lower (Table 2). In terms of absolute amounts, a substantial majority (76.3 percent) of nonmanagers believed that workers have at least "some say" in job decisions, with almost half (47.5 percent) reporting a "good or great deal" of say. The pattern is similar for departmental decisions. However, for organizational policy decisions a slight majority (52.5 percent) believed that workers had little or no say; only 13.6 percent felt that workers had a good or great deal of say. Managers concurred in the *relative* amounts of worker PDM at each level, but tended to perceive somewhat higher *absolute* amounts, significantly so ($p < .10$) for organizational policy. Despite this, 30 percent of the managers believed that workers had little or no say in organizational policy; only 25.9 percent believed workers to have a good or great deal of influence at this level.

Nonmanagers perceived substantial gaps between desired and actual influence at all three decision levels (Table 2). Almost 50 percent of nonmanagers believed that workers had insufficient say in job and department decisions, and a majority (64 percent) believed so for organizational policies. Worker-owners did not significantly differ from nonowners. Managers reported less worker decisional deprivation, significantly so at the job and departmental levels, although substantial minorities believed

TABLE 2
Desired and Perceived Workers' Participation,
Managers and Nonmanagers, Wave 1 and Wave 2

	<i>Managers</i>		<i>Nonmanagers</i>		
	<i>Mean</i>	<i>σ</i>	<i>Mean</i>	<i>σ</i>	<i>t</i>
<i>Wave 1</i>					
Desired worker influence					
Job decisions	4.81	1.30	5.37	1.19	1.94*
Departmental decisions	4.96	1.09	5.07	1.12	.40
Organizational policies	4.41	1.09	4.30	.96	.47
Perceived "actual" worker influence					
Job decisions	4.67	.88	4.47	1.51	.74
Departmental decisions	4.44	.70	4.25	1.42	.83
Organizational policies	3.81	1.36	3.24	1.38	1.81*
Worker decisional deprivation					
Job decisions	.28	.54	1.04	1.35	3.60***
Departmental decisions	.58	.76	1.08	1.27	2.18**
Organizational policies	.95	1.46	1.34	1.18	1.33
<i>Wave 2</i>					
Desired worker influence					
Job decisions	5.10	1.00	5.31	1.08	.86
Departmental decisions	5.03	.93	4.98	.96	.24
Organizational policies	4.13	.97	4.27	1.07	.57
Perceived "actual" worker influence					
Job decisions	4.80	1.30	4.44	1.27	1.22
Departmental decisions	4.67	1.21	3.87	1.27	2.80***
Organizational policies	3.87	1.40	3.21	1.36	2.07**
Worker decisional deprivation					
Job decisions	.48	.64	.94	1.25	2.12**
Departmental decisions	.52	.80	1.20	1.34	2.79***
Organizational policies	.60	.91	1.18	1.36	2.19**

* $p < .10$, two-tailed

** $p < .05$, two-tailed

*** $p < .01$, two-tailed

that workers had too little say at departmental (41 percent) and organizational levels (44 percent). A few managers and nonmanagers believed that workers currently had too much say in some decisions—most notably, 15 percent of nonmanagers for departmental decisions, and 19 percent of managers for organizational policy.

Changes over Time—Among neither managers nor nonmanagers had desires for worker participation, perceived actual worker PDM, or perceived worker deprivation changed significantly one year later. However, a slight increase in the managers' desire for worker PDM in job decisions removed previous significant differences between managers and nonmanagers on this subject (Table 2). Because nonmanagers tended to report slightly lower PDM in departmental decisions and managers reported slightly more, there now were significant differences between these groups in this area, in addition to their previously differing perceptions of worker PDM in organizational policy. Because they perceived somewhat less worker deprivation in overall policy, managers now reported significantly less worker deprivation at all three levels than did

nonmanagers. Nonmanagers now perceived the largest decisional gap to be at the departmental level, by a very slight margin over the organizational policy level.

Discussion

The finding that about half of the nonmanagers believed that PDM at all three decision levels had increased since employee purchase is of note for two reasons. That substantial numbers believed job and departmental PDM had increased, despite a lack of formal mechanisms or pressures, may indicate that some supervisors had voluntarily altered their supervisory styles, a conclusion supported by interview data. That fully half of the nonmanagers did not believe even a slight increase in worker influence in policy decisions had occurred, despite objective facts such as two worker directors, is perplexing. One possibility is that these workers are extrapolating from their direct experience. Perceiving no change in their daily work routines or relationship with supervisor, they perceive no change in PDM in organizational policy either. That individuals who reported no change in PDM in policies also tended to report no change at the other two levels supports this. Alternatively, this perception may simply reflect little confidence in the ability of workers and their representatives to affect managerial decisions meaningfully at the policy level, in accordance with Mulder's (1971) contention.

Two findings of major interest are that worker-owners did not differ from nonowners in their desires for PDM and the similarity to the pattern of desires found by Hespe and Wall (1976) in conventional organizations. Thus, it appears that even in an employee-owned situation workers are interested primarily in participating in those decisions closest to them and their work, areas in which they may feel that they can contribute most effectively. The findings here did differ from those of Hespe and Wall (1976) in that the greatest decisional gap (at wave 1) was at the policy level rather than the departmental level, possibly indicating that worker-owners have a higher absolute desire for PDM in policy decisions. It is possible that employee ownership increased the desire for PDM at all three levels, thus preserving the relative desires. However, the expectation that the experience of participating might increase future worker desires for PDM was not supported. It may be that the amount of increased PDM necessary to trigger this did not occur. Further, since PDM did not continue to increase over time, despite decisional gaps perceived at wave 1, it would seem unreasonable for workers to increase their expectations.

That the decisional gaps perceived by nonmanagers did not decrease over time might be explained by the relatively small gaps perceived by managers at wave 1. Because their desires for worker PDM did not increase over time, they would have little reason to encourage increased PDM. Nonetheless, in concluding, it should be noted that although PDM did not continue to increase over time, employee ownership did seem

initially to increase worker PDM at all three decision levels, and these initial increases were stable. However, much further research is necessary to clarify the relationship between PDM and ownership and to identify possible moderating factors.

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AGE AND WORK VALUES

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This research note examines the relationship between age and work values and indicates possible avenues for future research and theoretical development. Cherrington (1977) has presented three arguments explaining why older workers are more work oriented than younger workers. First, one's perspective and frame of reference are changed by the sheer number as well as the different kinds of experiences associated with growing older. Second, specific historical experiences, such as the great depression or World War II, have a strong impact on one's work values. Third, the work values of older and younger workers are different because older

workers received different kinds of training and socialization pressures than did younger workers.

Two empirical studies have reported a significant positive relationship between age and work values. Susman (1973) found that older workers reported greater pride in job accomplishment among a sample of 256 employees. Aldag and Brief (1975) reported a significant correlation coefficient of .305 between age and the pro-Protestant ethic scale of Blood (1969). In contrast, Taylor and Thompson (1976) reported negative relationships between age and three of the five work values they measured. However, the relationships were not particularly consistent. Empirical comparisons of older and younger workers show that older workers generally have higher incomes, more seniority, higher socioeconomic status, and less education. It is necessary, therefore, to determine whether work values are related to age or to other explanatory variables.

If age is significantly related to work values, even when the effects of income, education, sex, seniority, and occupational level are controlled, then the differences in the work values of older and younger workers might be attributed to the kind of socialization process they have experienced—consistent with social learning and moral development theory. However, if income, sex, education, seniority, or occupational level are closely related to work values, then the three arguments presented earlier would not be supported. The work values of major interest to this research are associated with the traditional work ethic: the moral importance of work and pride in craftsmanship (Blood, 1969; Wollack, Goodale, Wijting, & Smith, 1971). Four other values that have appeared in the literature also were examined: upward striving, importance of money, importance of friends over work, and acceptability of welfare (Wollack et al., 1971; Goodwin, 1972).

Method

Sample—In order to examine the effects of age on work values, a survey was made of 3,053 workers in 53 companies throughout the United States. The companies were predominantly involved in manufacturing. So that there would be a broad sampling of responses, the number of workers sampled in any particular company was limited to 80 employees. If divisions of the same company were located in different communities, each was treated as a separate company. Within each company the sample was stratified to obtain approximately 50 percent operative employees in production or assembly line jobs, 20 percent supervisors or foremen, and 30 percent employees in middle management, clerical, or staff positions.

Questionnaire—The questionnaire consisted of 191 items regarding attitudes toward one's specific job, toward the company, and toward work in general. Also included were several demographic questions. The questionnaire was pilot tested among employees in two different organizations

and modified slightly to eliminate some ambiguities. (A copy of the questionnaire, a more complete description of the organizations sampled, the questionnaire development, and the factor analyses are available upon request from the senior author.)

Measures of the independent variables in the study were obtained by responses to conventional items regarding age, sex, years of education, years of service with the company, average monthly take-home pay, and occupation. The occupational status of each job was assigned using Duncan's (1961) socioeconomic scale of job classifications.

The six work values were measured by items that were either created by the research team or taken from the survey of work values (SWV) (Wollack et al., 1971), the pro-Protestant ethic scale (Blood, 1969), or a study of welfare recipients by Goodwin (1972). Each item was measured by a 7-point scale where 1 = strongly disagree and 7 = strongly agree. These items were factor analyzed to examine the factor structure and to assure that the items were measuring the separate concepts. The items that had high factor loadings were averaged to form a scale score for each factor. These scale scores were used rather than factor scores weighted by the factor score coefficients because they were more easily interpreted on the scales contained in the questionnaire. However, the results were essentially the same with scale scores or factors scores because they were highly correlated (between .88 and .96).

The reliability of the work value scores was examined by computing the odd-even split-half reliabilities. The stability of the factor structure was examined by splitting the sample, factor analyzing each sample separately, and computing factor congruence coefficients as suggested by Harmon (1967). The split-half reliabilities corrected for attenuation ranged from .69 to .78; the factor congruence coefficients were all greater than .94.

The moral importance of work variable was comprised of five items, two of which came from Blood's (1969) pro-Protestant ethic scale (e.g., "Working hard makes a man a better person"). Pride in craftsmanship was comprised of six items, four of which came from the SWV (e.g., "A worker should do a decent job whether or not his supervisor is around"). Upward striving consisted of three items, two of which came from the SWV (e.g., "A promotion to a higher-level job usually means more worries and should be avoided for that reason"—reverse scored). Importance of money was measured by two items taken from the SWV (e.g., "When a man is looking for a job, money should be the most important consideration"). Importance of friends over work was comprised of two items ("My friends would not think much of me if I did not have a good job" and "It is more important to get along with your friends than to work hard at a job"). Acceptability of welfare was adapted from a study by Goodwin (1972) asking how acceptable government welfare, church welfare, or help from family or friends would be if one's income were inadequate.

Results

The data were analyzed in multiple regression equations to examine the relationships between work values and six independent variables: age, income, seniority, education, occupational status, and sex. Sex was treated as a dummy variable and coded zero for male and one for female.

The correlation matrix is presented in Table 1. An analysis of the matrix indicated no multicollinearity among the independent variables (Heise, 1969; Haitovsky, 1969).

TABLE 1
Correlation Matrix of Independent Variables^a

	Sex	Age	Seniority	Occupation	Income	Education
Sex						
Age	-.110					
Seniority		-.189				
Occupation		.650				
Income			-.146			
Education			.032	.241		
			.021	.245	-.123	
				.466	.536	
					.376	

^aTest for absence of multicollinearity: Haitovsky's $X^2_H = 719.08$, $p < .005$, indicating that the hypothesis regarding the presence of multicollinearity can be rejected.

Moral Importance of Work—When all the variables were allowed to compete freely to enter into a stepwise regression, age entered first and explained 9 percent of the variance on this dimension. It was followed in relative importance by education. The beta for age was statistically significant and its sign clearly indicated that the moral importance of work increases with age. The beta for education was also significant but negative. The betas on the remaining four variables were not significant (Table 2).

Pride in Craftsmanship—Again, age proved to be the greatest explanatory factor with regard to the internalization of this particular work value. It entered the equation first and its beta was significant. Although the amount of variance it alone explained was small, the sign of the regression coefficient indicated a direct relationship with age. Next in order of relative importance was sex, with females indicating a slightly stronger commitment to pride in craftsmanship than did males. The only other variable with a significant *F*-ratio was occupational status, which had a positive beta.

Upward Striving—This particular value was most strongly related to occupational status, which explained only 2 percent of the total variance, followed in relative importance by income. Both of these variables had positive betas. The final variable with a significant *F*-ratio was sex. Females had a generally lower degree of upward striving than did males.

Importance of Money—Education was the best predictor of this value. Its beta was negative and statistically significant. Age and occupation also had significant, negative betas.

TABLE 2
Multiple Regression Analysis
of the Correlates of Six Work Values^a

<i>Variable Entered</i>	<i>r</i>	<i>R</i>	<i>Change in R²</i>	<i>β</i>	<i>F-Ratio</i>
<i>Moral Importance of Work</i>					
Age	.296	.296	.088	.305	143.625*
Education	-.079	.299	.002	-.031	1.687*
Seniority	.182	.300	.000	-.018	.516
Occupational status level	-.026	.300	.000	-.020	.671
Sex	.009	.300	.000	.014	.471
Income	.048	.300	.000	.006	.056
<i>Pride in Craftsmanship</i>					
Age	.156	.156	.024	.167	41.474*
Sex	.079	.184	.009	.109	25.543*
Occupational status level	.046	.192	.003	.055	5.059*
Income	.031	.193	.000	.018	.527
Education	-.018	.193	.000	-.013	.303
Seniority	.085	.193	.000	-.010	.146
<i>Upward Striving</i>					
Occupational status level	.149	.149	.022	.097	15.544*
Income	.139	.169	.006	.069	7.465*
Sex	-.093	.174	.002	-.050	5.287*
Seniority	.004	.176	.001	-.026	.965
Education	.114	.177	.000	.024	1.007
Age	.012	.177	.000	.007	.073
<i>Importance of Money</i>					
Education	-.128	.128	.016	-.107	19.744*
Age	-.075	.158	.008	-.087	11.356*
Occupational status level	-.119	.165	.002	-.053	4.707*
Sex	.025	.166	.000	-.019	.815
Income	-.096	.167	.000	-.019	.550
Seniority	-.041	.167	.000	.004	.029
<i>Importance of Friends over Work</i>					
Sex	-.119	.119	.014	-.116	28.496*
Age	-.059	.140	.005	-.085	10.605*
Education	-.088	.151	.003	.074	9.171*
Seniority	-.005	.153	.001	.041	2.497
Income	.042	.154	.000	-.017	.471
Occupational status level	.033	.155	.000	-.013	.275
<i>Acceptability of Welfare</i>					
Age	-.128	.128	.016	-.141	29.745*
Occupational status level	-.122	.175	.014	-.061	6.235*
Education	-.100	.186	.004	-.069	8.361*
Income	-.122	.188	.001	-.056	5.082*
Sex	.014	.192	.002	-.043	3.935*
Seniority	-.068	.193	.000	.022	.741

^adf = 5; 3000

**p* < .01

Importance of Friends over Work—The analysis indicated that sex had the greatest explanatory power, with females placing less importance on this value than males. Age also was significantly related to the importance of friends over work, and the negative beta suggests that friends were

more important to younger workers. Education followed in order of importance, with a significantly positive beta.

Acceptability of Welfare—Age was the most significant predictor of the acceptability of welfare, and the negative beta indicated a greater willingness of younger workers to accept welfare assistance. Occupational status, education, income, and sex also had significant negative betas.

Summary and Conclusions

This research explored the relationship of age and six work values while controlling for the confounding effects of other variables. Data were obtained from a nationwide sample of 3,053 workers at all organizational levels.

The results indicated that older workers placed greater importance on the moral importance of work and pride in craftsmanship. Younger workers placed greater emphasis on the importance of money, importance of friends over work, and the acceptability of welfare as an alternative to work. Upward striving was not related to age. Older workers held more strongly to those work values traditionally taught and considered important in industrial society.

These results suggest that work values are acquired in part through a process of socialization similar to the development of other moral behaviors. There are at least three reasons consistent with social learning theory and moral development that have been proposed to explain this relationship between age and work values: (1) individual maturation, (2) differences in the historical events one has experienced, and (3) changes in the kinds of training and socialization received. The results of the research presented here show that the apparent relationship between age and work values is not due to the confounding effects of seniority, education, income, sex, and occupational status. This finding was particularly significant in the case of the two values associated with the traditional work ethic: the moral importance of work and pride in craftsmanship.

Additional research is needed to explain further the development of work values. It is both practically and scientifically imperative that it be determined whether the relationship of age to traditional work values is due to a maturation process which younger workers will also experience, a historical process which is unique to each generation, a training-learning process subject to control and modification, or some mixture of all three. In the light of the empirical results of this paper, work values need to be examined as an aspect of other moral development.

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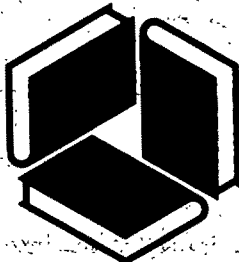
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